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## INTRODUCTION

Good communication is the foundation of a shared clinical decision-making process and is crucial for the maximization of patient benefit from treatment for cancer. Yet, patients with cancer often elect to receive more aggressive or investigational treatments, the potential benefits of which are uncertain, while physicians have reported that they would not make similar treatment decisions for themselves (Clark, et al, 1990; Lind, et al, 1991; Moore, et al, 1988; Mackillop, et al, 1986; Slevin, et al, 1990). Despite the experimental nature of bone marrow and stem cell transplantation, breast cancer advocacy groups have been very active in mandating insurance coverage for treatment (Florida, 1995; Georgia, 1995; Massachusetts, 1995; New Hampshire, 1995; Rhode Island, 1995; Virginia, 1995).

Patients and physicians have also reported differences in their interpretation of the content of their interactions (Mackillop, et al, 1988; Mosconi, et al, 1991; Siminoff, et al, 1989), in their estimates of patient participation in the decision-making process (Strull, et al, 1990), and in their expectation of treatment benefits (Mackillop, et al, 1988; Mosconi, et al, 1991; Siminoff, et al, 1989). In a survey of cancer patient expectations, 33% of patients being treated palliatively indicated that they thought their treatment was potentially curative, although their physician had told patients the goals of treatment in ninety percent of these cases (Mackillop, et al, 1988). Patient overestimation of treatment benefit has been documented by independent

observers of patient-physician consultations.

In communication about disease risk and probability of therapeutic outcomes, the manner in which the information is presented can affect both physician interpretation of disease frequency (Farrow, et al, 1992; Kalet, et al, 1994; Malenka, et al, 1993) and patients' preferences for treatment outcomes (Fetting, et al, 1994; Hux, et al, 1995; Mazur and Merz, 1994; Mazur and Merz, 1993; Mazur, et al, 1990). More specifically, when presented with a choice between a certain outcome (one possible outcome with known occurrence) and an uncertain outcome (several possible outcomes, each characterized by the probability of their occurrence), the manner in which the outcome is framed has been shown to influence that choice (Eraker and Sox, 1992; Hughes, 1993; Kahneman and Tversky, 1981; Kahneman and Tversky, 1979; Marteau, 1989; McNeil, et al, 1982). The initial studies of information framing by Kahneman and Tversky presented subjects with the following scenario:

Imagine that the U.S. is preparing for the outbreak of an unusual Asian disease, which is expected to kill 600 people. Two alternative programs to combat the disease have been proposed. Assume that the exact scientific estimates of the consequences of the programs are as follows:

Problem 1

If program A is adopted, 200 people will be saved.

If program B is adopted, there is a one-third probability that 600 people will be saved and a two-thirds probability that no people will be saved.

Problem 2

If program C is adopted, 400 people will die.

If program D is adopted, there is a one-third probability that nobody will die and a two-thirds probability that 600 people will die.

The expected outcomes are equivalent among the four options, but in problem one, where the outcomes were described in a positive frame (as lives saved), 72% of subjects chose the sure option, program A, and 28% of subjects chose the gamble, program B (Kahneman and Tversky, 1981; Kahneman and Tversky, 1979). In problem two, where the outcomes were described by a negative frame (as death resulting from disease), 22% of subjects chose the sure option, program C, and 78% of subjects chose the gamble, program D (Kahneman and Tversky, 1981; Kahneman and Tversky, 1979). When presented with choices that are identical except in their expression of treatment outcome, individuals were found to be risk averse for gains expressed as lives saved and risk-seeking when avoiding losses, death from disease.

Framing effects have been documented with the use of scenarios describing treatment for lung cancer (McNeil, et al, 1982), breast cancer (O'Connor, 1989), angina (Eraker and Sox, 1982), headache (Eraker and Sox, 1982), and unspecified chronic disease (Eraker and Sox, 1982). Other scenarios have elicited responses based on the frame of the treatment options, but in the opposite direction--more subjects have chosen the riskier option when presented with a positive frame (Hughes, 1993; Marteau, 1989; O'Connor, 1985; Wilson, et al, 1987). However, in actual clinical practice, framing effects have been difficult to document and interpret (Llewellen-Thomas, et al, 1995; O'Connor, et al, 1987). Observational studies cannot manipulate patient characteristics, physician characteristics, and the health care delivery systems that have been shown to be related to treatment decisions (Deber, et al, 1987; GIVIO, 1988; Liberati, et al, 1987; Liberati, et al, 1990). Further, in observational studies of clinical settings, the actual conversation between physicians and patients is not constrained in content or duration, which makes conversation difficult to analyze in a systematic fashion. The large sample sizes required to evaluate each of these potential patient and physician covariates necessitate the development of a more innovative method for the evaluation of information framing in clinical practice.

In the following sections, we describe the stepwise development of such a measure for use in evaluating the physician presentation of treatment options in a clinical setting. We used a variety of research tools and analytic methods in the development of this instrument. First, sequential patient consultations were audiotaped in order to develop general categories of

conversation used by physicians when describing treatment options. Second, we surveyed physicians using clinical scenarios of breast cancer patients. We requested they provide treatment recommendations and free-form descriptions of treatment options. This information was utilized to finalize the framing instrument and to measure information framing in the physicians' written descriptions of treatment options. Finally, simulated patients--actors trained to portray a breast cancer patient based on the information presented in the physician survey--went to community physicians and audiotaped their conversations. We used both qualitative and quantitative statistical methods to evaluate the instrument in the detection of information framing.

We chose specifically to evaluate information framing in late-stage metastatic breast cancer, for which no standard of care currently exists. High-dose chemotherapy followed by autologous bone marrow infusion (ABMT) or peripheral blood stem cell infusions (PBSC) are an expensive and experimental treatment option for women with metastatic breast cancer. The risk of death during treatment has been reported at approximately 10% (Peters, et al, 1993) and varies across centers where the procedure is performed. Additionally, the percentage of patients with complete response is limited. Almost all patients experience some serious side effects. With high costs and toxicity, the benefits of high-dose chemotherapy remain controversial (Hillner, et al, 1992 ; Eddy, 1992). Yet, despite the controversy surrounding the effectiveness of bone marrow or stem cell transplantation, these therapies are diffusing rapidly. Currently, at least six states have laws requiring insurers to cover these

procedures, resulting largely from the efforts of patient advocacy groups (Florida, 1995; Georgia, 1995; Massachusetts, 1995; New Hampshire, 1995; Rhode Island, 1995; Virginia, 1995).

In situations such as this, where breast cancer patients frequently seek very aggressive or high-risk care with a small chance of a longer-term remission or cure, the role of the physician as relayer of information and patient advisor is crucial. Here, physician communication patterns such as the use of information framing may be most relevant in terms of the patient decision-making process.

## BODY

In this section we describe the stepwise development of an instrument to assess information framing in physician communication about breast cancer treatment options. This process began with tape-recorded physician interviews with sequential patients at their initial consultation with an oncologist. These audiotapes were transcribed and their content used in the initial development of categories for the framing instrument.

These audiotapes were followed by the administration of a written survey containing three case scenarios of metastatic breast cancer patients. In a large mail survey of community oncologists, physicians were requested to make free-form treatment recommendations based on the clinical information presented in each scenario. The scenarios varied by the clinical information related to patient prognosis to create variability in physician recommendations. The impact of varying this clinical information on physician communication patterns was unknown.

Based on the results of the survey, two simulated patients were trained to portray a breast cancer patient seeking advice on her treatment options. The patient scenario that introduced the most variability in physician response was developed for the simulated patient. Each simulated patient presented the physicians with identical clinical information and responded to

any questions about their condition. This interaction was audiotaped and transcribed. Sequential development of the instrument through audiotapes, a written survey, and use of simulated patients allowed us to control for patient variability while maximizing the instrument's responsiveness.

**PHASE I: BREAST CANCER SCENARIO-BASED SURVEY OF PHYSICIANS**

We developed a survey to record the information that physicians convey to patients with breast cancer. We initially implemented this survey in a population of physicians likely to discuss high-risk treatments with their cancer patients--oncologists affiliated with a stem cell transplant network and identified as having performed at least one stem cell transplant in the previous year. To elicit information conveyed to breast cancer patients, the survey presented three breast cancer scenarios varied by expected prognosis based on stage, previous therapy, age, and comorbid conditions. The survey also requested that physicians provide a written discussion of treatment options for each case in a style similar to their usual conversations with patients (see Appendix A for a copy of the physician survey).

Content analysis, a process that divides a conversation into its smallest meaningful pieces (Weber, 1990), was used to evaluate the information contained in the free-form descriptions of treatment options from the audiotapes, written surveys, and audiotaped simulated patient interaction. We developed a content-based coding instrument using audiotapes of initial consultations between oncologists and their patients. Subject or content categories were defined further by coding a sample of 40 cases from the written physician survey.

Based on review of tape-recorded physician-patient interactions (the initial phase of the study where we audiotaped physician consultations with their patients), seventeen preliminary content categories were developed to represent the subject matter discussed in physician

communication with oncology patients. These content categories included the mention of the type of previous therapy; future therapy; future benefits; reference to tumor growth or metastases; specific reference to cancer, nodes, or disease; response to therapy; side effects of treatment; survival or long-term cure; quality of life; other aspects of life (e.g., family, friends); shorter-term outcome (e.g., remission); physician experience with similar patients or clinical trial evidence; physician preference for treatment; specific mention of risk or chance; general uncertainty; general effects of treatment; and other symptoms of disease. This series of content categories was used to evaluate the written surveys.

For ease of coding, the coding worksheets were divided into four sections for each of these seventeen content categories--a general discussion section unrelated to the discussion of treatment options, and three sections devoted to independent discussion of treatment options. Each content category in each section was further divided to incorporate the context of statements--positive or in support of the treatment option, negative or against the treatment option, or neutral, which was mentioned but was neither in favor of nor against the treatment option. For example, the discussion of remission was classified as short-term outcome, positive, where recurrence would be classified as short-term outcome, negative (see Appendix B for a copy of instrument).

The written description of treatment options was assessed by two coders blinded to the case, the physician's treatment recommendation, the reason for treatment recommendation, and the

physician subject number. After each coder completed all available cases, the four sections of the coding worksheet were collapsed into summary counts of positive, negative, or neutral statements by content category for each case.

From 93 survey respondents, 219 free-form scenario recommendations were analyzable by both coders. Dummy variables were created to represent the presence of each combination of each content and context category for the three scenarios. Correspondence was evaluated across the seventeen content categories and the three context categories for each of the 219 scenarios. Agreement between the two coders was over 85% for 112 of the 123 combinations of case, content, and context. For the other eleven categories, agreement between the two coders was over 70% (See Table 1). Because of the lack of variability in this binary data, kappa statistics are not reported.

#### SURVEY ANALYSES FOR DETECTION OF FRAMING EFFECTS

Descriptive demographic statistics were calculated for respondents and nonrespondents where this information was available. Differences between respondents and nonrespondents were evaluated with chi-square tests for categorical variables and with t-tests for continuous variables. Descriptive statistics for treatment recommendations and the primary goals of treatment were also calculated. Comparisons between the three scenarios were evaluated with chi-square tests.

The model of information framing in previous studies used symmetrically opposed outcomes (e.g., life vs. death) to examine subject responses to positive and negative frames (Eraker and Sox, 1992; Hughes, 1993; Kahneman and Tversky, 1981; Kahneman and Tversky, 1979; Marteau, 1989; McNeil, et al, 1982). Since we requested written free-form descriptions of treatment options in the survey responses, the potential number of content areas was very large. We approached the evaluation of information framing in this study by assessing physician phrasing in two sets of analyses. First, we assessed the impact of the expected patient scenario prognosis on content and context phrasing, and then we evaluated physician characteristics, practice characteristics, and treatment recommendations relative to their phrasing of treatment options.

To evaluate the phrasing of treatment recommendations among patient cases, we calculated the frequency of each content and context area across the respondents for each of the three patient cases. We also calculated the frequency of each content and context area for each case where aggressive treatment was recommended. Differences in the frequencies of the discussion of these content areas (i.e., survival, quality of life) and context of the content areas (i.e. positive discussion of survival, negative discussion of survival) among the three cases were assessed as supportive of information framing in physician discussion of treatment options. The results of the chi-square tests of homogeneity are reported only where the number of observations per cell indicates that the test is valid.

We also evaluated the phrasing of treatment recommendations across cases using a model of information framing based on clinical practice. We took the discussion of disease as a negative frame, one focusing the patient on sunk costs and the unalterable fact of their disease. We took the discussion of other aspects of life, such as family or quality of life, as a positive frame, one focusing patients on their future. We summarized this phrasing information across the three cases and assigned binary variables corresponding to the mention of disease and the mention of other aspects of life as dependent variables. Physician characteristics, practice characteristics, treatment recommendations, and the reason for treatment recommendation were used as the independent variables in univariate and multivariate logistic regression analyses.

Comparisons where  $p < 0.05$  are reported as statistically significant, and comparisons where  $p < 0.10$  are discussed as trends.

## RESULTS

Ninety-one percent of the physicians responding to the survey described themselves as white, 6.5% as Hispanic, 1% as Asian, and 1% as other. On average, the physicians were 46 years old. About 94% were male. During the year of the survey, these physicians treated an average of three transplant patients. These demographics and practice characteristics were similar between physicians responding to the survey and nonrespondents (see Table 2). The

respondents were evenly divided between general oncology and a mixed practice of general oncology and stem cell transplant. On average, physicians reported that they saw a typical patient 2.3 times prior to recommending treatment for their cancer.

In response to the first scenario case, which described a previously healthy 39-year-old woman with newly diagnosed, high-risk stage II breast cancer, 97% of physicians recommended stem cell transplantation, and the remainder recommended standard-dose chemotherapy (see Appendix A for a complete description of each case contained within the survey). In the second case scenario, which described a 47-year-old woman with metastatic disease following adjuvant chemotherapy for stage II disease, 55% recommended stem cell transplantation, 13% recommended intermediate-dose chemotherapy, and 33% recommended standard-dose chemotherapy. In case three, which described a 49-year-old woman with stable metastatic disease, 32% of physicians recommended stem cell transplantation, 10% recommended intermediate-dose chemotherapy, and 58% recommended standard-dose chemotherapy (see Table 3). These written case scenarios elicited different treatment recommendations from physicians in our sample ( $p<0.001$ ).

When providing a reason for their treatment recommendations in case one, 95% of physicians recommended treatment to maximize survival, and 5% recommended treatment to maximize quality of life (see Table 3). In case three, these percentages almost reversed--73% recommended treatment to maximize quality of life, and 27% recommended treatment to

maximize survival. In case two, 56% of physicians recommended treatment to improve survival, and 44% of physicians recommended treatment to improve quality of life. The goals of treatment were also different between the three patient scenarios ( $p<0.01$ ).

#### Evaluation of the phrasing of treatment recommendations

The content categories and the context of the statements used by the physicians in the free-form descriptions of treatment options for each of the patient cases are summarized in Table 4. There were significant differences among cases in the frequency at which previous therapy, cancer growth/metastases, response to therapy, survival, quality of life, remission/recurrence, physician experience with similar patients or clinical trials, and risk/chance were discussed ( $p<0.05$ ). We also found differences in the discussion of disease ( $p<0.10$ ). When information was summarized by content area, more physicians discussed risk or chance and their experience with similar patients or clinical trial results in case one more than in the other two cases ( $p<0.05$ ). More physicians discussed previous therapy, response to therapy, and quality of life in case three than in the other two cases ( $p<0.05$ ). In case two, more physicians referred specifically to the cancer or affected nodes and cancer growth or metastases, and they phrased their discussion using uncertainty modifiers such as "might" or "could" ( $p<0.05$ ) (see Table 4).

There were also differences among the cases in the context of the statements used (see Table 4). In case one, where 97% of oncologists recommended aggressive treatment, recurrence

was mentioned more than twice as frequently as remission. Recurrence was mentioned less frequently than remission in case two (55% recommended aggressive treatment) and case one (32% recommended aggressive treatment). In case two, negative aspects of cancer growth and survival were mentioned much more frequently than their positive aspects. In case three, survival was mentioned negatively more frequently than positively. The content of physician descriptions of treatment options and the context used in presenting these content areas differed systematically among the three case scenarios.

We evaluated the physician description of treatment options in the clinical model of information framing using specific references to other aspects of patient life (positive frame) and disease (negative frame). In univariate analyses of the positive frame, we found that physicians recommending aggressive treatment across the three cases were less likely to discuss other aspects of life ( $p<0.01$ ) as compared to physicians recommending aggressive treatment for a single case. Physicians recommending aggressive treatment across two cases were more likely to discuss other aspects of life as compared to physicians recommending aggressive treatment for a single case ( $p<0.10$ ). The treatment goal of improving survival across the three cases was associated with a decreased likelihood of mentioning other aspects of life ( $p<0.01$ ). Physicians recommending treatment to improve quality of life in two cases were more likely to discuss other aspects of life ( $p<0.10$ ). Patient characteristics and practice characteristics were unrelated to the mention of other aspects of life ( $p>0.20$ ). When controlling for patient characteristics and practice characteristics in multivariate analysis, only

the recommendation of aggressive treatment across the three cases was related to a decreased likelihood of mentioning other aspects of life ( $p<0.02$ ), the positive frame. The addition of interactions between the covariates did not affect the estimates.

In univariate analyses of the negative frame, the increase in the number of words used in the descriptions was related to an increased likelihood of a specific reference to disease ( $p<0.07$ ). Male physicians were less likely to refer specifically to disease than female physicians ( $p<0.08$ ). Physicians recommending aggressive treatment across two of the cases were more likely to refer specifically to disease as compared to physicians recommending aggressive treatment in only a single case ( $p<0.06$ ). All other physician characteristics, practice characteristics, and goals of treatment were unassociated with the recommendation of aggressive treatment across the three cases ( $p>0.10$ ). When controlling for the influence of physician characteristics and practice characteristics, the number of words used in the description of treatment options was related to the mention of disease ( $p<0.03$ ). Additionally, physicians describing themselves as practicing in a mixed general oncology and transplant group were more likely to mention disease when discussing treatment recommendations ( $p<0.10$ ) as were physicians performing more than three transplantations in the previous year ( $p<0.05$ ). All other covariates were unrelated to discussion of treatment options using a negative frame. The addition of interactions between the covariates did not affect the estimates.

In the evaluation of the positive frame, individual physician characteristics and practice characteristics were unrelated to the reference to quality of life during the description of treatment options ( $p>0.10$ ). However, in the evaluation of the negative frame, both physician practice type and the number of transplant patients treated in the previous year were related to an increased reference to disease ( $p<0.08$ ). Although we found support for increased use of a negative and positive frame where physicians recommended aggressive treatment across two scenarios in univariate analysis, these effects were not found after controlling for other factors. However, we did find that when physicians recommended aggressive treatment across the three patient cases they were less likely to use a positive frame when describing treatment options.

## II. PHASE II: BREAST CANCER SIMULATED PATIENT INTERVIEW OF PHYSICIANS

Based on the results of the physician survey, we developed a patient history to replicate the second scenario (see Appendix D for a summary of the patient history). The second scenario had the most variability in treatment recommendation (see Table 3), goals of treatment (see Table 3), and discussion of content areas (see Table 4). Two women with no personal history of breast cancer were chosen to play the same simulated patient. Both participated in the development of a detailed psychosocial history of the patient role, which included information on medical history, occupation, husband's occupation, and children. The simulated patient was required to have a relatively flat affect and was trained to portray the recurrence as a setback but one that she was determined to get through. The simulated patients were then scheduled to portray their role with physicians who agreed in advance to participate in the study.

### Simulated Patient Development

Training and evaluation of patient performance took place over three half-day sessions. After the simulated patients were comfortable in their roles, further training and feedback occurred in evaluations with physicians practicing at Georgetown University Medical Center. The simulated patient performances were evaluated by three physicians and two observers. Physicians and observers completed questionnaires with 5-point linear analog scales describing

domains related to simulated patient performance. Scores were evaluated as paired t-tests. The simulated patients received similar ratings on friendliness ( $P>0.10$ ), knowledge of breast cancer ( $p>0.10$ ), communication skills ( $p>0.10$ ), expressiveness ( $p>0.10$ ), excitability ( $p>0.10$ ), use of physical expression ( $p>0.10$ ), and speed of speech ( $p>0.10$ ). Both simulated patients prompted the physician to review the impact of treatment options on the expected quality of life and survival in all three cases. However, one of the patients was judged to be more positive in her presentation than the other ( $p>0.05$ ).

#### Physician Sample

The physician sample frame included the Washington, D.C., metropolitan area. Physicians included in the study were required to be board certified in either hematology or medical oncology, to have attended medical school in the United States, and to have a published address in the *1996 Physician Specialist Directory*. Phone numbers were obtained from either the physician specialist directory or the Washington, D.C., metropolitan area phone book. Physicians were sent two letters describing the study and were offered an honorarium of \$65.00 to cover the cost of patient time. One week after the letter was sent, all physicians were phoned to discuss participation in the study.

Of the 78 physicians sent letters requesting participation in the study, 25 physicians were either no longer at the same address or retired. Two physicians did not see patients and declined to participate. Sixteen physicians refused to participate and twelve never returned a

phone call. All physicians at a correct address received at least five separate phone calls and a second copy of the letter requesting participation by facsimile. Twenty-three physicians agreed to participate and twenty-two, (42%) scheduled and completed interviews. The simulated patients were assigned to a physician based on scheduling availability.

Upon arriving at a physician's office, the simulated patient presented the receptionist with a completed medical history form (see Appendix D) and a letter of referral describing the case and more recent medical history. The patient also brought copies of a brain scan, bone scan, chest X-ray, and other diagnostic tests. Prior to beginning the interview, the physicians signed an informed consent agreement, and the entire conversation was audiotaped. After completion of the interview, the physicians completed a questionnaire containing a scenario identical to one used in the written survey, the third scenario (see Appendix D). The simulated patient completed a survey related to the interview to assess her subjective interpretation of the consultation (See Appendix D). All tapes were transcribed.

#### INSTRUMENT DEVELOPMENT

The tapes of sequential cancer patients used in the phase I study for the written survey were re-reviewed and coded to provide additional insight into physician-patient conversations. New categories related to the description of treatment options were added to the content instrument: insurance status/cost issues; clinical information about the patient; patient preference; diagnostic tests. Also, the number of words used in the consultation, the number of patient

questions, and the number of physician questions were collected to measure the level of physician-patient interaction. In order to quantify the heterogeneous nature of physician-patient conversations, the initial physician description of disease and treatment options (unprompted discussion), patient questions, and physician replies were recorded separately.

From 22 participating physicians, 19 free-form scenario recommendations were analyzable by both coders. Dummy variables were created to represent the presence of each combination of each content and context category for the three scenarios. Correspondence was evaluated across the twenty-one content categories and the three context categories for each of the scenarios. Agreement between the two coders was over 80% for 61 of the 63 combinations of content and context. When collapsed into content categories, agreement was over 84% for all but two categories. For the other two categories, agreement between the two coders was over 68% (see Table 7).

Transcripts were available for all twenty-two participating physicians. Given the high correspondence between two coders, transcripts of physician interviews were coded by a single coder. Correspondence was verified by having a second coder review thirteen randomly selected transcripts. Agreement was over 75% for all but two of the content categories. Agreement was over 60% for the other two categories (see Table 7). Because of the lack of variability in this binary data, kappa statistics are not reported.

Frequencies within each content and context area were evaluated separately for the general categories of physician-patient interaction: the initial physician description of treatment options (un-prompted), and physician responses to patient questions (physicians were prompted by simulated patient questions related to survival and quality of life.). The content of physicians' discussions differed based on whether they were prompted by patient questioning (see Table 8). In nine of twenty-one content categories, physicians utilized different phrasing when prompted than when not prompted ( $p<0.10$ )

#### ANALYSES OF WRITTEN SURVEYS AND SIMULATED PATIENT TRANSCRIPTS

Summary statistics related to physician characteristics and patient impressions of the physician consultation were calculated. Continuous variables are reported with means and standard deviations and evaluated with t-tests. Categorical variables are reported as frequencies and evaluated with chi-square tests. Because of the difference in the patient affect during training, assessments of objective physician characteristics are made for the two patients.

Univariate and multivariate log-linear regression analyses were used to evaluate information framing in physician discussion of treatment options. As in the phase I study, we took the discussion of disease as a negative frame, one focusing the patient on sunk costs and the unalterable fact of their disease. We took the discussion of other aspects of life, such as family or quality of life, as a positive frame, one focusing patients on their future. Separate

analyses were completed using either the positive or negative frame as the dependent variable. Physician characteristics, practice characteristics, survey treatment recommendation, and patient perception of the consultation were used as independent variables in univariate and multivariate log-linear regression analyses.

Comparisons where  $p < 0.05$  are reported as statistically significant, and comparisons where  $p < 0.10$  are discussed as trends.

## RESULTS

The majority of physicians in our sample were white and male. The average age was approximately 50 years, and the physicians had completed medical school, on average, 24 years ago (see Table 9).

About 85% of physicians either referred or treated fewer than ten patients for high-dose chemotherapy with stem cell or bone marrow transplantation in the past year. The remainder treated or referred more than thirty patients during the past year. Physicians stated that they would see the average patient approximately twice before offering a treatment recommendation (see Table 9).

In response to the survey scenario, 74% of physicians recommended high-dose chemotherapy followed by stem cell or bone marrow transplantation, and the remaining 26% recommended

standard-dose chemotherapy. The primary reason for this recommendation was to improve survival (47%) followed by improving quality of life (32%) (see Table 9).

Based on objective characteristics, physicians appeared to be randomly distributed between the simulated patients (see Table 10). There were no differences between the simulated patient assignment in physician age ( $p<0.88$ ), gender ( $p<0.25$ ), years since graduation from medical school ( $p<0.92$ ), or the number of patients treated or referred for high-dose chemotherapy followed by stem cell or bone marrow transplantation ( $p<0.99$ ). Physicians also responded similarly to the average number of times they would see a patient prior to making a treatment recommendation ( $p<0.99$ ), the scenario recommendation ( $p<0.21$ ), and the reason for recommending treatment ( $p<0.23$ ) (see Table 10) .

Both patients reported that they were comfortable in the physicians' offices and that physicians were both receptive to and comfortable discussing treatment options (see Table 11). Their scores on these measures were similar ( $p>0.10$ ). Patients had similar assessments of the physicians' treatment recommendations and the primary goal of that recommendation. The patients reported that physicians recommended high-dose therapy followed by stem cell or bone marrow infusion most frequently and were primarily concerned with improving survival. Neither patient felt that the physicians were thorough in discussing their psychosocial history.

One patient was more uncomfortable in the physicians' offices than the other ( $p<0.004$ ) (see

Table 10). This was the patient seeing fewer physicians, so this figure may be unduly influenced by the small number of observations. Because of the potential for differences between the patients in their assessment of the physicians and portrayal of the breast cancer patient role, simulated patient identity was included in all information framing models.

#### Evaluation of the Negative Frame (Discussion of Disease and Metastases)

In univariate analyses, younger physicians, physicians who treated or referred more than five patients for stem cell or bone marrow transplantation, and physicians whose consultations contained more than 2500 words were more likely to use a negative frame when describing treatment options to the simulated patient ( $p<0.05$ ). Physicians who reported that they spoke to a patient twice or more before making a treatment recommendation were less likely to use a negative frame ( $p<0.05$ ). Physicians who recommended aggressive treatment in the written survey were more likely use a negative frame ( $p<0.05$ ) as were those whose primary goal of treatment in the written survey was other than survival ( $p<0.05$ ) (See Table 12).

The simulated patient's perception of the interaction was also related to the use of the negative frame. Consultations where patients felt the physician's treatment recommendation was either stem cell or bone marrow transplantation were more likely to include a negative frame ( $p<0.10$ ). Consultations where patients felt survival was the primary goal of treatment were less likely to have a negative frame ( $p<0.05$ ) (See Table 12). No other physician characteristics or treatment characteristics were related to the use of a negative frame

( $p>0.10$ )

Similar results were found in multivariate analysis of the negative frame (see Table 13). Younger physicians, physicians who graduated less than fifteen years ago, and physicians whose consultations were more than 2500 words were more likely to use a negative frame ( $p<0.05$ ). Physicians who reported they spoke to a patient twice or more before recommending treatment were less likely to use a negative frame when describing treatment options ( $p<0.05$ ). Physicians who recommended aggressive treatment in the written scenario were more likely to utilize a negative frame ( $p<0.05$ ), yet consultations where patients perceived that physicians were recommending aggressive treatment were less likely to contain a negative frame ( $p<0.10$ ) (see Table 13.)

The simulated patient's perception of treatment recommendation or goal of treatment was unrelated to the use of the negative frame when controlling for physician characteristics, practice characteristics, written scenario recommendation, or information related to the physician-patient interaction ( $p>0.10$ ). However, the identity of the simulated patient was related to the use of a negative frame ( $p<0.05$ ).

#### Evaluation of the positive frame (Discussion of Quality of Life and Other Aspects of Life)

In univariate analysis, physicians younger than 50, those who graduated less than fifteen years ago, and those who treated or referred more than five patients for stem cell or bone marrow

transplantation were more likely to use a positive frame ( $p<0.05$ ). A written physician recommendation to improve survival was related to an increased use of a positive frame ( $p<0.10$ ) (see Table 14).

Consultations where patients perceived the treatment recommendation to be aggressive or the goal of treatment to improve survival were less likely to have utilized a positive frame ( $p<0.05$ ). No other physician characteristics or treatment characteristics were related to the use of a positive frame ( $p>0.10$ ) (See Table 14)

Again, similar results were found in multivariate analyses (see Table 15). Physicians who treated or referred more than five patients for stem cell or bone marrow transplantation and consultations consisting of more than 2500 words were more likely to use a positive frame ( $p<0.05$ ). Younger physicians were less likely to use a positive frame ( $p<0.05$ ). A written survey recommendation of aggressive treatment and patient perception of a treatment recommendation to improve survival were less likely to result in use of the positive frame ( $p<0.05$ ) (See Table 15).

As in the multivariate analysis of the negative frame, simulated patient identity was related to the use of a positive frame ( $p<0.08$ ).

## DISCUSSION

In the written survey, the main framing effect--after controlling for physician characteristics and practice characteristics--was the use of a negative frame when recommending aggressive treatment option for breast cancer (see Table 8). This effect was also found when evaluating the simulated patient transcripts--physicians recommending aggressive treatment in a written scenario were less likely to use a positive frame when discussing treatment options with the simulated patient (see Table 15). Our analysis of the instrument we developed for this study detected--both in the written survey and the audiotaped simulated patient interviews--the use of a positive frame when physicians recommended less aggressive treatment.

Although we did not detect the converse in the phase I physician survey (i.e., the recommendation of aggressive treatment being associated with the use of a negative frame (see Table 8)), this effect was detected in the phase II evaluation of the simulated patients (see Table 13). Physicians who recommended aggressive treatment in the written scenario were more likely to utilize a negative frame when describing treatment options to the simulated patient, even after controlling for physician characteristics, practice characteristics, simulated patient identity, and patient perceptions of the interaction (see Table 13). Our ability to detect this negative framing effect, even with only 22 observations, greatly improved between phase I and phase II of the study. This may be a result of phase II's close approximation of a clinical setting as well as our further development of the instrument.

The analysis of the phase II simulated patient study revealed some interesting discrepancies related to patient perception of treatment recommendation and goal of treatment. The case scenarios used in both studies were ordered by patient prognosis. The first scenario described the best patient prognosis, and the last described the worst. In the phase I survey, physicians recommending aggressive treatment for the third scenario (worst prognosis) almost uniformly recommended aggressive treatment for the first and second scenarios. The phase II simulated patient study utilized scenario two for the training of the simulated patient and scenario three for the written survey. It was anticipated that any written recommendation for aggressive treatment would be accompanied by a simulated patient's perception of a recommendation for aggressive treatment. However, this was not necessarily the case. In univariate analysis of the positive frame, a written recommendation to improve survival was more likely to result in the use of a positive frame, but patient perception of treatment recommendation to improve survival was less likely to be used in a positive frame (see Table 14). This effect was found in the multivariate analysis of the positive frame as well (see Table 15). Analyses of the negative frame showed better convergence between physician written recommendations and simulated patient's perception of the interaction (see Table 12 and Table 13).

Obviously, the physician-patient interaction is complicated. We have documented the use of information framing in physician description of treatment options to breast cancer patients. Additional research into the impact of information framing on patient perception of disease and its treatment may aid treatment decision-making in the future.

## CONCLUSIONS

The sequential process of instrument development utilized in this study allowed us to simultaneously refine the instrument while providing an increasingly realistic clinical environment for evaluation of information framing. By using a written survey in phase I and simulated patients in phase II, we were able to demonstrate the reproducibility and reliability of the instrument across coders.

In the phase I written survey, we were able to detect variability in written responses to breast cancer scenarios both between physicians and among scenarios. We were able to detect differences between the scenarios, even while holding the treatment recommendation constant. When the framing instrument was utilized with transcripts from twenty-two physicians in phase II, the instrument was sensitive enough to detect differences in physician communication patterns after controlling for the length of the conversation, physician characteristics, practice characteristics, and treatment recommendations.

The content framing instrument is sensitive to physician response to different written scenarios. It is also sensitive to the structure of physician-patient interaction and can detect differences in unprompted physician description of treatment options and prompted responses to directed patient questions.

Most importantly, the instrument allows us to detect information framing in written surveys

and in audiotaped conversation with simulated patients. Information gained from learning more about information framing and its impact on patient decision-making can help breast cancer patients and their families improve their decision-making related to breast cancer treatment.

## **Appendix A. Breast Cancer Scenario Based Survey**

## **Demographic Physician Questionnaire**

Thank you for taking the time to provide the following demographic information.

Please provide the following personal information in the spaces provided below:

Date of birth   /  /

Please check the boxes which describe you best:

White       Male  
 Black       Female  
 Hispanic  
 Asian  
 Native American  
 Other \_\_\_\_\_

Please provide the following information about your practice in the spaces provided below:

When did you graduate from medical school? (month, year) \_\_\_\_/\_\_\_\_

Where did you go to medical school? \_\_\_\_\_

Where did you do your residency? \_\_\_\_\_

Where did you do your residency? \_\_\_\_\_

Where did you do your fellowship? \_\_\_\_\_

**Please describe the setting where you practice:**

(Check as many as apply. If you practice in more than one setting, please place the percentage time in the space provided)

[ ] private office \_\_\_\_\_  
[ ] hospital \_\_\_\_\_  
[ ] university hospital \_\_\_\_\_  
[ ] single-specialty group practice \_\_\_\_\_  
[ ] multi-specialty group practice \_\_\_\_\_  
[ ] other \_\_\_\_\_  
(please specify) \_\_\_\_\_

What type of practice are you in?

- general oncology
- bone marrow transplant only
- mixed (general oncology and bone marrow transplant)

How many bone marrow transplant patients are new to your practice per year?

- 1 - 5
- 6 - 10
- 11 - 20
- 21 - 30
- greater than 30

About what percent of these patients are:

- new patients
- failed other treatment, referred locally
- failed other treatment at cancer centers
- other (please specify) \_\_\_\_\_

About how many times would you see a typical patient, on average, before making a treatment decision?

- once
- twice
- depends--as few as \_\_\_\_\_ and as many as \_\_\_\_\_
- other  
(please specify) \_\_\_\_\_

### Case 1

A previously healthy 39 year old married premenopausal woman discovers a lump on routine breast exam. She sees her gynecologist who recommends a mammogram and performs a physical exam. Physical exam is normal except for a 3x1 cm mass without accompanying skin changes in the right upper quadrant of her right breast. Bilateral mammograms are performed, with the left mammogram being normal and the right mammogram confirming a mass of 3.5x1.5 cm with microcalcifications suggestive of malignancy. The patient is referred to a surgeon who subsequently performs an incisional biopsy removing the entire mass and performing a subsequent lymph node dissection. The pathology report reveals a 3.5x1.5 cm infiltrating ductal carcinoma. There are areas of fat necrosis with perilymphatic invasion. Additional testing reveals that this tumor is aneuploid with a high DNA labeling index and does not express HER2-NEU. The tumor was ER negative and PR negative. Nineteen of 27 lymph nodes are involved with tumor. The surgeon orders additional tests before referring this patient to a medical oncologist. The tests include a urinalysis, CBC, liver function tests, alkaline phosphatase, and CA 15.3 all of which are normal. Bone scan, chest x-ray, abdominal CT are performed and reveal no evidence of metastatic disease. The patient has decided that she will undergo mastectomy of her right breast and now is referred to a medical oncologist to discuss the role of adjuvant chemotherapeutic options.

As this patient's physician, which form of adjuvant chemotherapy would you advise your patient to receive?

- a. I would recommend conventional dose chemotherapy for this patient.
- b. I would recommend conventional dose chemotherapy followed by high-dose chemotherapy and peripheral blood progenitor cell or autologous bone marrow support.
- c. I would recommend an intermediate dose of chemotherapy requiring growth factor support, but not requiring the infusion of peripheral blood progenitor cells or autologous bone marrow.

What is the primary consideration for this choice?

- Maximize survival
- Maximize quality of life
- Other (please specify)  
\_\_\_\_\_

How would you phrase your treatment recommendation to this patient (Please record your response as closely as possible to your actual conversation style)?

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### **Case 2**

A 47 year old woman that you previously treated for stage II breast cancer three years ago with mastectomy, radiation, and six courses of CAF returns to your office complaining of right upper quadrant pain. Ultrasound of the right upper quadrant reveals two lesions approximately 2x1 cm each in the right and left lobe of the liver respectively. Blood work performed at this time reveals a normal CBC, electrolytes, creatinine, and urinalysis. The SGOT and SGPT are normal. The total bilirubin is slightly elevated at 2.1 and the alkaline phosphatase is 427. A CEA is normal, however, the CA 15.3 is approximately 6 times normal. You explain to the patient that you believe she has recurrent breast cancer and that additional staging tests will need to be performed. A CT scan of the head and a bone scan are performed and are normal. CT scan of the chest, abdomen and pelvis confirms the two liver lesions seen by ultrasound and identified three small pulmonary nodules in the upper lobe of the right lung. Each nodule is approximately 1 cm in diameter and are clearly new when compared to a CT scan performed three years earlier. Bone marrow aspiration and biopsy reveal no evidence of malignancy by routine histological evaluation. This patient's estrogen and progesterone status were known to be negative on the original tumor. The patient is currently taking no medications and is otherwise in good health.

Which of the following options would you recommend to this patient?

- a. I would recommend conventional dose chemotherapy for this patient.
- b. I would recommend conventional dose chemotherapy followed by high-dose chemotherapy and peripheral blood progenitor cell or autologous bone marrow support.
- c. I would recommend an intermediate dose of chemotherapy requiring growth factor support, but not requiring the infusion of peripheral blood progenitor cells or autologous bone marrow.

What is the primary consideration for this choice? (If more than one consideration, please order numerically)

- Maximize survival
- Maximize quality of life
- Other (please specify)  
\_\_\_\_\_

How would you phrase your treatment recommendation to this patient (Please record your response as closely as possible to your actual conversation style)?

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### Case 3

A 49 year old woman whom you treated two years ago with Adriamycin-based conventional dose chemotherapy for a stage III infiltrating ductal carcinoma of the left breast. At the time of diagnosis, this patient was ER positive. Six months ago while on vacation in Florida, this patient was evaluated at an Emergency Room for back pain. An x-ray was normal and she was put on non-steroidals which helped the pain for a few weeks. However, the pain persisted when the non-steroidals were discontinued and the patient followed up with a general medical oncologist. A bone scan was performed that revealed foci consistent with metastatic disease in the right hip, the L-2 and L-3 vertebral bodies and the right humerus. Additional staging work-up at that time included a head CT which was normal, however a CT of the chest and abdomen revealed 5 to 7 lesions in the right and left lobes of the liver, none exceeding 1.5cm in diameter. The patient was started on Tamoxifen and because of her symptoms received 4 cycles of conventional dose CAF in Florida. Follow-up testing done three months after initiating therapy revealed some resolution of L-1, L-2 lesions and near complete resolution of the right humerus bone lesion. Two of the original 7 liver lesions remain and no additional sites of metastatic disease were identified. The patient now presents in your office after completing her stay in Florida to discuss future treatment options. She is currently asymptomatic and only taking Tamoxifen. Restaging studies are performed which reveals no change in the bone lesions from two months ago, however, the remaining two liver lesions have doubled in size and a new foci of metastatic disease is identified in the caudate lobe of the liver.

Which of the following options would you recommend to this patient?

- a. I would recommend conventional dose chemotherapy for this patient.
- b. I would recommend conventional dose chemotherapy followed by high-dose chemotherapy and peripheral blood progenitor cell or autologous bone marrow support.
- c. I would recommend an intermediate dose of chemotherapy requiring growth factor support, but not requiring the infusion of peripheral blood progenitor cells or autologous bone marrow.

What is the primary consideration for this choice?

- Maximize survival
- Maximize quality of life
- Other (please specify)  
\_\_\_\_\_

How would you phrase your treatment recommendation to this patient (Please record your response as closely as possible to your actual conversation style)?

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## Appendix B. Coding Sheet

Survey number	Written survey or transcribed visit? (circle one)	General Discussion			Option 1			Option 2			Number of MD q's	
					Recommend [ ]			Recommend [ ]				
		+	-	Neut	Pro	Con	Neut	Pro	Con	Neut		
type of previous therapy												
future therapy												
cancer/tumor growth(p=slow growing, c=spread quickly)												
cancer/tumor/nodes/disease												
response to therapy												
side effects of treatment/toxicity												
survival,long-term cure, prognosis (5-yr survival)												
other aspects of life (p-family etc)												
future (benefits-increase in knowledge, other patients)												
quality of life												
p=permission (length of life), c=recurrence												
evidence/experience/data (reference)												
general uncertainty (hopefully, think, generally)												
physician preference (I, my opinion)												
risk/chance/likelihood												
general effect of treatment (well, bad)												
other symptoms of disease												
insurance status/cost issues												
clinical info about patient												
diagnostic tests												
patient preference												
CODING KEY: X=physician, O=patient, A=MD reply		Number of words		Number of pt. questions		Number of pt. comments						

(CONTINUED FROM OTHER SIDE)	Option3			Option4			Option5			Option 6		
	Recommend [ ]			Recommend [ ]			Recommend [ ]			Recommend [ ]		
	Pro	Con	Neut									
type of previous therapy												
future therapy												
cancer/tumor growth(p-slow growing, c-spread quickly)												
cancer/tumor/nodes/disease												
response to therapy												
side effects of treatment/toxicity												
survival,long-term cure, prognosis (5-yr survival)												
other aspects of life (p-family etc)												
future (benefits-increase in knowledge, other patients)												
quality of life												
p-remission (length of life), c-recurrence												
evidence/experience/data (reference)												
general uncertainty (think, believe, try to, don't know)												
physician preference (I, my opinion)												
risk/chance/likelihood												
general effect of treatment (well, bad)												
other symptoms of disease												
insurance status/cost issues												
clinical info about patient												
diagnostic tests												
patient preference												

CODING KEY: X=physician, O=patient, A=MD reply

## Appendix C. List of Tables

### PHASE I: BREAST CANCER SCENARIO SURVEY

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Table 5	Univariate Analyses of Physician Characteristics, Practice Characteristics, Treatment Recommendations, and Use of Negative and Positive Frames
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### PHASE II: BREAST CANCER SIMULATED PATIENT INTERVIEW

Table 7	Agreement Between Coders
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Table 9	Characteristics of Physicians Seeing Simulated Patients
Table 10	Characteristics of Physicians Assigned to Simulated Patients
Table 11	Simulated Patient's Perception of Interview
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Table 13	Multivariate Analyses of Physician Characteristics, Practice Characteristics, Treatment Recommendations and the Use of a Negative Frame
Table 14	Univariate Analyses of Physician Characteristics, Practice Characteristics, Treatment Recommendations, and the Use of a Positive Frame
Table 15	Multivariate Analyses of Physician Characteristics, Practice Characteristics, Treatment Recommendations and the Use of a Positive Frame

**Table 1. Percent Agreement Between Coders  
by Content and Context**

Content Category	Case 1	Case 2	Case 3
Previous therapy			
positive	98.8	91.7	92.5
negative	98.8	91.7	89.6
neutral	100.0	93.1	98.5
Future benefits or future therapy			
positive	98.8	97.2	94.0
negative	100.0	100.0	100.0
neutral	98.8	87.5	91.0
Cancer growth			
positive	96.3	91.7	94.0
negative	95.0	75.0	85.1
neutral	100.0	100.0	100.0
Cancer/Node/Disease	*	*	*
positive	82.5	76.4	77.6
negative	75.0	73.6	88.1
Response to Therapy			
positive	96.3	94.4	94.0
negative	98.8	97.2	92.5
neutral	98.8	95.8	97.0
Side effects of treatment			
positive	92.5	93.1	97.0
negative	97.5	95.8	98.5
neutral	93.8	97.2	97.0
Survival or long-term cure			
positive	88.8	83.3	91.0
negative	87.5	90.3	86.6
neutral	93.8	94.4	97.0
Quality of life			
positive	98.2	91.7	94.0
negative	100.0	94.4	100.0
neutral	97.7	94.4	95.5
Remission/Recurrence			
positive	95.9	86.1	88.1
negative	97.7	84.7	91.0
neutral	100.0	97.2	98.5
Physician experience or results of clinical trials			
positive	95.0	90.3	98.5
negative	96.8	98.6	97.0
neutral	91.3	93.1	97.0
Physician preference for treatment			
positive	92.5	90.3	86.6
negative	97.5	95.8	91.0
neutral	96.3	95.8	97.0
Risk or Chance			
positive	88.8	100.0	97.0
negative	91.3	100.0	91.0
neutral	100.0	98.6	97.0
General uncertainty			
positive	67.5	75.0	85.1
negative	86.3	77.8	83.6
neutral	95.0	87.5	92.5
General effect of treatment			
positive	88.8	87.5	85.1
negative	96.3	93.1	85.1
neutral	100.0	100.0	100.0

**Table 2. Demographic Characteristics and Practice Characteristics of Survey Respondents and Non-Respondents**

	<b>Respondents (n=93)</b>	<b>Non- Respondents (n=55)</b>
<b>Average Age</b>	45.5 (5.99)	45.2 (5.41)
<b>Race</b>		
White	91.3%	86.0%
Hispanic	6.5	8.0
Asian	1.1	2.0
Other	1.1	2.0
<b>Gender</b>		
Male	93.5%	86.0%
Female	6.5	12.0
<b>Years since graduation from medical school</b>		
6-10	8.6%	*
11-15	19.8	
16-20	37.0	
21-25	18.5	
>25	16.0	
<b>Average number of stem-cell (bone marrow) transplant patients treated during past year</b>	3.4 (3.02)	2.5 (3.02)
<b>Practice type</b>		
general oncology	49.5%	*
mixed (general oncology and stem-cell transplant)	50.5	
<b>Average number of times see typical patient prior to recommending treatment</b>	2.34 (1.2)	*

**Table 3. Case Scenario Recommendations**

	Case 1	Case 2	Case 3	$\chi^2$	p-value
Treatment Recommendation					
Stem-Cell Transplant	97.4%	54.9%	31.9%	73.23	0.001†
Intermediate Dose Chemotherapy	0.0	12.7	10.1		
Standard Dose Chemotherapy	2.6	32.4	57.9		
Primary Reason for Treatment Recommendation					
Survival	95.0%	56.0%	26.5%	72.5	0.000†
Quality of Life	5.0	44.0	72.5		

† Significant at p<0.05

**Table 4. Physician Discussion of Treatment Options by Content and Context of Phrasing**

Content Category	Case 1	Case 2	Case 3	$\chi^2$	p-value
Previous therapy					
positive	2.5	6.9	11.3	4.63	0.099
negative	1.3	11.0	25.4	20.74	0.001†
neutral	0.0	6.9	5.6	*	*
Future benefits or future therapy					
positive	2.5	2.7	5.6	*	*
negative	0.0	0.0	0.0	*	*
neutral	1.3	0.0	2.8	*	*
Cancer growth/metastases					
positive	1.3	11.0	18.3	12.52	0.002†
negative	11.3	32.9	22.5		
neutral	0.0	0.0	0.0		
Cancer/Node/Disease					
positive	*	*	*	*	*
negative	40.0	53.4	35.2	5.29	0.071
neutral	1.3	0.0	1.4	*	*
Response to Therapy					
positive	2.5	15.1	19.7	11.45	0.003†
negative	1.3	1.4	4.1	*	*
neutral	1.3	2.7	1.4	*	*
Side effects of treatment					
positive	10.0	6.9	12.7	1.38	0.501
negative	10.0	8.2	4.3	1.85	0.397
neutral	2.5	2.7	1.4	*	*
Survival or long-term cure					
positive	65.0	38.4	18.3	34.22	0.001†
negative	28.8	63.0	40.9	18.57	0.001†
neutral	3.8	2.7	1.4	*	*
Quality of life					
positive	3.8	16.4	22.5	11.75	0.003†
negative	0.0	2.7	0.0	*	*
neutral	1.3	2.7	4.3	*	*
Remission/Recurrence					
positive	17.5	30.1	15.5	5.57	0.062
negative	45.0	16.4	11.3	27.06	0.001†
neutral	0.0	0.0	0.0	*	*
Physician experience or results of clinical trials					
positive	32.5	8.2	0.0	35.70	0.001†
negative	7.5	5.5	2.8	*	*
neutral	23.8	11.0	5.6	11.11	0.004†
Physician preference for treatment					
positive	21.3	16.4	28.2	2.93	0.231
negative	2.5	6.9	8.5	*	*
neutral	2.5	1.4	0.0	*	*
Risk or Chance					
positive	41.3	21.9	14.1	15.4	0.001†
negative	55.0	23.3	25.4	21.29	0.001†
neutral	0.0	1.4	1.4	*	*
General uncertainty					
positive	38.8	37.0	22.5	5.24	0.073
negative	13.8	23.3	11.3	4.35	0.11
neutral	7.5	8.2	8.5	0.05	0.975
General effect of treatment					
positive	31.3	15.1	16.9	7.20	0.027†
negative	11.3	15.1	15.5	.705	0.703
neutral	2.3	0.0	0.0	*	*

† significant at p<0.05

**Table 5. Univariate Logistic Analysis of the Reference to the Mention of Other Aspects of Life (Positive Frame) or Disease (Negative Frame) Across Three Patient Scenarios**

<b>Parameter</b>	<b>Other Aspects of Life</b>		<b>Disease</b>	
	<b>Estimate</b>	<b>p-value</b>	<b>Estimate</b>	<b>p-value</b>
Number of Words	0.0062	0.2067	0.0078	0.0661†
Age				
Greater than 45	-0.4158	0.4272	-0.6286	0.1769
45 or less	---	---	---	---
Gender				
Male	-1.0152	0.3600	-1.9290	0.0810†
Female	---	---	---	---
Race				
White	-0.8131	0.4694	-1.7177	0.1251
Non-White	---	---	---	---
Number of Times Physician would Speak with Patient before Making a Treatment Recommendation				
Two or More Times	0.5878	0.3155	-0.1603	0.7405
Less than Twice	---	---	---	---
Number of New Stem Cell/Bone Marrow Transplant Patients a Year				
More than Five New Patients	0.1054	0.8434	0.0588	0.9010
Less than Five New Patients	---	---	---	---
Practice Type				
General Oncology	-0.2721	0.6028	-0.2113	0.6461
Mixed (General Oncology and Transplant)				
Treatment Recommendation				
Aggressive Treatment for all Three Scenarios	-1.7789 1.0217	0.0020* 0.0965†	-0.0000 0.9808	1.0000 0.0546†
Aggressive Treatment for Two Scenarios	---	---	---	---
Aggressive Treatment for a Single Scenario				
Primary Reason for Treatment Recommendation across the Three Cases:				
Three Recommendations to Improve Survival	-4.5182 0.8835	0.0000* 0.1035	0.3138 -0.5302	0.5770 0.2528
Two Recommendations to Improve Survival (One Recommendation to Improve Quality of Life)				
One Recommendation to Improve Survival (Two Recommendation to Improve Quality of Life)				

\*Significant at p<0.05

†Significant at p<0.10

**Table 6. Multivariate Logistic Analysis of the Reference to Other Aspects of Life (positive frame) and Disease (negative frame) in the Treatment Recommendation**

<b>Parameter</b>	Positive Context		Negative Context	
	<b>Estimate</b>	<b>p-value</b>	<b>Estimate</b>	<b>p-value</b>
<u>Intercept</u>	1.2238	0.5904	2.8831	0.1152
<u>Physician characteristics</u>				
Gender				
Male	0.2237	0.8729	-1.9946	0.1279
Female	---	---	---	---
Race				
White	-0.0416	0.9751	-1.9570	0.1273
Non-White	---	---	---	---
Age				
45 and over	-0.9152	0.2044	-0.2214	0.6908
Under 45	---	---	---	---
Practice Type				
General oncology and bone marrow transplant	-0.2949	0.7002	-1.0517	0.0949†
General oncology only	---	---	---	---
<u>Practice characteristics</u>				
Number of Words in Descriptions	0.0090	0.1657	0.0098	0.0317*
Recommendation of Aggressive Treatment	-2.4515	0.0014*	-0.5105	0.4366
Three aggressive recommendations	-0.2216	0.7858	-0.7019	0.2708
Two aggressive recommendations	---	---	---	---
One aggressive recommendation	---	---	---	---
Number of Times Physician Would Speak with Patient Before Recommending Treatment	0.4069	0.5532	-0.4280	0.4487
More than once	---	---	---	---
Once	---	---	---	---
Number of New Bone Marrow/Stem-Cell Transplant Patients a Year	0.2218	0.7627	0.6169	0.3076
---	---	---	---	---

\*Significant at p<0.05

†Significant at p<0.10

**Table 7. Agreement Between Coders on the Content of Physician Response to Scenario and Physician Discussion with Simulated Patient**

	Written Scenario (n=19)	Simulated Patient (n=13)
Previous therapy	94.7%	92.3%
Future benefits/future therapy	68.4	84.6
Cancer growth/metasteses	84.2	92.3
Cancer/Node/Disease	84.2	100.0
Response to Therapy	84.2	76.9
Side effect of treatment	94.7	92.3
Survival/long-term cure	100.0	100.0
Other aspects of Life	94.7	76.9
Future Benefits	100.0	84.6
Quality of life	89.5	92.3
Shorter term outcome	89.5	84.6
Physician experience	100.0	84.6
Risk or chance	94.7	84.6
General uncertainty	79.0	92.3
Physician preference	94.7	84.6
General effect of treatment	84.2	92.3
Other symptoms of disease	100.0	92.3
Insurance status/cost issues	94.7	100.0
Clinical information about patient	100.0	100.0
Patient preference	94.7	61.5
Diagnostic tests	100.0	61.5

**Table 8. Evaluation of Content Across the Physician Initiated Conversationand Physician Responses**

	Physician Initiated (n=22)	Physician Response (n=22)	
Previous therapy	95.5	59.1	p<0.004
Future benefits/future therapy	81.8	63.6	p<0.176
Cancer growth/metasteses	95.5	77.3	p<0.079
Cancer/Node/Disease	100.0	90.9	p<0.148
Response to Therapy	72.7	72.7	p<1.000
Side effect of treatment	100.0	95.5	p<0.312
Survival/long-term cure	100.0	95.5	p<0.312
Other aspects of Life	100.0	81.8	p<0.036
Future Benefits	13.6	4.6	p<0.294
Quality of life	90.9	86.4	p<0.635
Shorter term outcome	90.9	86.4	P<0.635
Physician experience	100.0	72.7	p<0.008
Risk or chance	77.7	63.6	p<0.322
General uncertainty	95.5	86.4	p<0.294
Physician preference	90.9	72.7	p<0.118
General effect of treatment	95.5	81.8	p<0.154
Other symptoms of disease	81.8	40.9	p<0.005
Insurance status/cost issues	27.3	4.6	p<0.039
Clinical information about patient	95.5	72.7	p<0.039
Patient preference	95.5	31.8	p<0.001
Diagnostic tests	72.7	22.7	p<0.001

**Table 9. Characteristics of Physicians Seeing Simulated Patients**

	Number	Percent
<b>Average Age</b>	49.8	8.40
<b>Race</b>		
White	18	94.7
Other	1	5.3
<b>Gender</b>		
Male	17	89.5
Female	2	10.5
Years since graduation from medical school	24.2	8.64
Number of stem-cell or bone marrow transplants treated or referred in the past year		
1-5	8	42.1
6-10	8	42.1
11-20	0	0.0
21-30	0	0.0
>30	5	15.8
Average number of times see typical patient prior to treatment recommendation	1.7	0.69
<b>Scenario Recommendation</b>		
Stem-cell transplant	14	73.7
Intermediate dose chemotherapy	0	0.0
Standard dose chemotherapy	5	26.3
Other		
<b>Primary reason for treatment recommendation</b>		
Survival	9	47.4
Quality of Life	6	31.6
Other	4	21.1

**Table 10. Characteristics of Physicians Assigned to Simulated Patients**

	Patient 1 (n=12)	Patient 2 (n=7)	
Average Age	49.67	50.29	p<0.882
Gender			
Male	10	7	
Female	2	0	P<0.253
Years since graduation from medical school	24.0	24.43	P<0.921
Number of stem-cell or bone marrow transplants treated or referred in the past year			
1-5	5	3	
6-10			
11-20			
21-30	2	1	
>30			
Average number of times see typical patient prior to treatment recommendation	1.71	1.71	P<0.986
Survey Scenario			
Recommendation			
Stem-cell transplant	10	4	
Intermediate dose chemotherapy	0	0	
Standard dose chemotherapy	2	3	
Other			P<0.211

**Table 11. Simulated Patient Assessment of Interview**

	Total	Patient 1	Patient 2	
Treatment recommendation				
High dose chemotherapy with stem cell or bone marrow transplantation	9	5	3	
Standard dose chemotherapy	5	2	4	
Other	5	5	0	p<0.117
Primary reason for treatment recommendation				
Survival	9	4	5	
Quality of Life	3	3	0	
Other	2	2	0	
Both	5	3	2	p<0.232
Comfort in Physician's Office ( 1=not comfortable to 5=very comfortable)	4.05	3.67	4.71	P<0.018
Number of treatment options discussed				
Patient	2.68	2.83	2.42	
Coder				p<0.326
Physician comfort in discussing treatment options (1=not comfortable to 5=very comfortable)	4.58	4.83	4.14	p<0.264
Physician receptive to discussing treatment options (1=very unreceptive to 5=very receptive)	4.40	4.45	4.29	p<0.754
Discussion of medical case (1=very thorough to 2=not at all thorough)	2.13	2.46	1.57	p<0.059
Discussion of psychosocial case (1=very thorough to 5=not at all thorough)	3.39	2.88	4.29	p<0.004

**Table 12. Univariate Log-Linear Analyses of the Use of a Negative Frame (Discussion of Disease and Metasteses) when Recommending Treatment**

Parameter	Estimate	p-value
Physician Age Less than 50 50 or greater	0.4559 -----	0.0001 -----
Years since graduation from medical school Greater than 15 15 or less	0.0615 -----	0.5224 -----
Number of Words in Transcript More than 2500 Less than 2500	1.2204 -----	0.0001 -----
Number of Patient referred for/treated with High Dose Chemotherapy followed by Bone Marrow or Stem Cell Transplantation More than five Five or less	0.234 -----	0.0064 -----
Number of Times a Physician Would Speak with an Average Patient before Recommending Treatment Twice or More Less than Twice	-0.1622 -----	0.0477 -----
Recommendation for Written Scenario Aggressive Treatment Other Treatment	0.2922 -----	0.0018 -----
Primary Goal for Recommendation in Written Scenario Survival Other	-0.3943 -----	0.0001 -----
Simulated Patient Perception of Treatment Recommendation Aggressive Treatment Other Treatment	0.1404 -----	0.0904 -----
Simulated Patient Perception of Primary Goal of Treatment Survival Other	-0.3321 -----	0.0001 -----

**Table 13. Multivariate Log-Linear Analyses of the Use of a Negative Frame (Discussion of Disease or Metasteses) when Recommending Treatment**

Parameter	Estimate	p-value
Physician Age Less than 50 50 or greater	0.6566 -----	0.0001 -----
Number of Years since Graduation from Medical School 15 or more years Less than 15 years	-0.2546 -----	0.0601 -----
Number of Words in Transcript More than 2500 Less than 2500	1.1229 -----	0.0001 -----
Simulated Patient 1 Simulated Patient 2	0.2619 -----	0.0500 -----
Number of Patient referred for/treated with High Dose Chemotherapy followed by Bone Marrow or Stem Cell Transplantation More than five Five or less	-0.0189 -----	0.9058 -----
Number of Times a Physician Would Speak with an Average Patient before Recommending Treatment Twice or More Less than Twice	-0.4046 -----	0.0130 -----
Recommendation for Written Scenario Aggressive Treatment Other Treatment	0.6137 -----	0.0036 -----
Primary Goal for Treatment Recommendation for Written Scenario Survival Quality of Life	-0.0100 -----	0.9299 -----
Patient perception of Treatment Recommendation Aggressive Treatment Other Treatment	-0.2802 -----	0.2703 -----
Patient Perception of Primary Goal of Treatment Recommendation Survival Other	-0.0710 -----	0.5532 -----

**Table 14. Univariate Log-Linear Analyses of the Use of a Positive Frame (Discussion of Quality of Life or Family) when Recommending Treatment**

Parameter	Estimate	p-value
Physician Age Less than 50 50 or greater	0.2512	0.0263
	-----	-----
Number of Years since Graduation from Medical School 15 or more years Less than 15 years	0.3707	0.0021
	-----	-----
Number of Words in Transcript More than 2500 Less than 2500	0.6391	0.0001
	-----	-----
Number of Patient referred for/treated with High Dose Chemotherapy followed by Bone Marrow or Stem Cell Transplantation More than five Five or less	0.3576	0.0024
	-----	-----
Number of Times a Physician Would Speak with an Average Patient before Recommending Treatment Twice or More Less than Twice	0.0011	0.9920
	-----	-----
Recommendation for Written Scenario Aggressive Treatment Other Treatment	-0.1458	0.2077
	-----	-----
Primary Goal for Treatment Recommendation for Written Scenario Survival Quality of Life	0.1834	0.0981
	-----	-----
Patient perception of Treatment Recommendation Aggressive Treatment Other Treatment	-0.4294	0.0004
	-----	-----
Patient Perception of Primary Goal of Treatment Recommendation Survival Other	-0.8681	0.0001
	-----	-----

**Table 15. Multivariate Log-Linear Analyses of the Use of a Positive Frame (Discussion of Quality of Life or Family) when Recommending Treatment**

Parameter	Estimate	p-value
Physician Age Less than 50 50 or greater	-0.4465 -----	0.0229 -----
Number of Years since Graduation from Medical School 15 or more years Less than 15 years	0.1158 -----	0.5607 -----
Number of Words in Transcript More than 2500 Less than 2500	0.7291 -----	0.0001 -----
Simulated Patient 1 Simulated Patient 2	-0.3577 -----	0.0762 -----
Number of Patient referred for/treated with High Dose Chemotherapy followed by Bone Marrow or Stem Cell Transplantation More than five Five or less	0.6048 -----	0.0052 -----
Number of Times a Physician Would Speak with an Average Patient before Recommending Treatment Twice or More Less than Twice	0.2712 -----	0.2754 -----
Recommendation for Written Scenario Aggressive Treatment Other Treatment	-0.6764 -----	0.0105 -----
Primary Goal for Treatment Recommendation for Written Scenario Survival Quality of Life	0.2580 -----	0.0807 -----
Patient perception of Treatment Recommendation Aggressive Treatment Other Treatment	0.3595 -----	0.2537 -----
Patient Perception of Primary Goal of Treatment Recommendation Survival Other	-0.8313 -----	0.0001 -----

## **Appendix D. Simulated Patient Material**

- 1. Simulated Patient Medical History**
- 2. Letter of Referral Describing Simulated Patient**
- 3. Simulated Patient Survey**
- 4. Physician Survey**

Name: Sharon White Age: 45 Single  Married  Divorced  Widow(er)  Date: \_\_\_\_\_

Occupation: graphic design All previous occupations: \_\_\_\_\_

Birth Place: Catonsville, MD

Education: 4 yrs. High School 4 yrs. College   yrs. Post Grad.

Telephone # (Home): \_\_\_\_\_ (Work): \_\_\_\_\_

Where you would like to be contacted re: Test Results, Appointments, etc.: \_\_\_\_\_

Please list all symptoms, and use this space for comments or questions you have for the doctor.

FAMILY HISTORY	IF LIVING	IF DECEASED	HAS ANY BLOOD RELATIVE EVER HAD:		Relationship to you:	
	AGE	HEALTH	AGE	CAUSE OF DEATH	Cancer	Yes or No
GRANDPARENTS					Tuberculosis	Yes or No
PATERNAL		early 70s		heart failure	Diabetes	Yes or No
MATERNAL			↓	heart failure, stroke	Heart Trouble	Yes or No
Father	65	good			High Blood Pressure	Yes or No
Mother	65	good			Stroke	Yes or No
Siblings brother	48	good			Epilepsy/Seizures	Yes or No
brother	46	good			Depression	Yes or No
					Mental Illness	Yes or No
					Alcoholism	Yes or No
Children Thomas	15	good			Drug Abuse	Yes or No
Shelly	13	good				

THIS IS A CONFIDENTIAL RECORD OF YOUR MEDICAL HISTORY. THIS INFORMATION WILL NOT BE RELEASED TO ANYONE WITHOUT YOUR PRIOR AUTHORIZATION.

ILLNESS: Have you ever had?

Measles	YES or NO
German Measles	YES or NO
Mumps	YES or NO
Chicken Pox	YES or NO
Pneumonia	YES or NO
Influenza	YES or NO
Rheumatic Fever	YES or NO
Heart Disease	YES or NO
Arthritis or Rheumatism	YES or NO
Bone or Joint Disease	YES or NO
Nearitis or Neuralgia	YES or NO
Bursitis, Sciatica	YES or NO
Polio or Meningitis	YES or NO
Gonorrhea or Syphilis	YES or NO
Anemia	YES or NO
Jaundice	YES or NO
Epilepsy	YES or NO
Migraine Headaches	YES or NO
Tuberculosis	YES or NO
Cancer	YES or NO

High/Low Blood Pressure  
High Cholesterol  
Nervous Breakdown  
Food/Chem/Drug Poisoning  
  
Hay Fever or Asthma  
Hives or Eczema  
Personal History:  
Frequent Infections/Bolts  
Any Problems Sleeping?  
Difficulty Concentrating  
Feelings of Stress or Anxiety  
Feelings of Sadness  
Any other disease?  
  
ALLERGIES: Are you allergic to:  
Any Medication?  
Foods, Substances, Animals?  
Do you have hayfever?  
If you answered "YES" to any question, please state the substance and reaction:

INJURIES: Have you had any broken bones or significant accidents? NO

Occupational Exposures: Are you exposed to any of the following during your job?

Chemicals YES or NO  
Toxic Fumes YES or NO  
If you answered "YES" to any question, please state what the substance is: \_\_\_\_\_

Weight: Now \_\_\_\_\_ One year Ago \_\_\_\_\_

Maximum \_\_\_\_\_ When \_\_\_\_\_

Transfusions: Have you ever had Blood or Plasma transfusion? YES or NO When \_\_\_\_\_

Surgery: Have you had:  
 Tonsillectomy  YES or NO  
 Adenectomy  YES or NO

Other surgeries and the dates: lumpectomy of rt. breast

Have you ever been hospitalized for any illness?  YES or NO

Please give reason and date: breast cancer, Fall 1992

X-Rays: Have you ever had x-rays of:

Chest  YES or NO

Stomach or Colon  YES or NO

Extremities  YES or NO

Back  YES or NO

Mammogram  YES or NO

EKG: Ever had an electrocardiogram?  YES or NO

Immunizations: Have you had?

Pneumovax  YES or NO

Tetanus Shots  YES or NO

Hepatitis B Vaccine  YES or NO

MMR  YES or NO

Flu Vaccine  YES or NO

DATE:

Systems: Do you now have or have you ever had?

Any eye disease, injury, impaired sight  YES or NO

Any ear disease, injury, impaired hearing  YES or NO

Any trouble w/nose, sinuses, mouth, throat  YES or NO

Fainting Spells  YES or NO

Loss of consciousness  YES or NO

Paralysis  YES or NO

Dizziness  YES or NO

Frequent or severe headaches  YES or NO

Depression or anxiety  YES or NO

Hallucinations  YES or NO

Enlarged glands  YES or NO

Enlarged Thyroid or goiter  YES or NO

Skin Disease  YES or NO

Chronic or Frequent Cough  YES or NO

Chest Pain or Angina Pectoris  YES or NO

Spitting Up Blood  YES or NO

Night Sweats  YES or NO

Shortness of Breath  YES or NO

Palpitation or Fluttering Heart  YES or NO

Swelling of Hands, Feet, or Ankles  YES or NO

Varicose Veins  YES or NO

Extreme Tiredness or Weakness  YES or NO

Kidney Disease or Stones  YES or NO

Bladder Disease  YES or NO

Albumin, Sugar, Pus, etc, in Urine  YES or NO

Difficulty in Urinating  YES or NO

Abnormal Thirst  YES or NO

Stomach Trouble or Ulcer  YES or NO

Indigestion  YES or NO

Appendicitis  YES or NO

Liver or Gall Bladder Disease  YES or NO

Colitis or other Bowel Disease  YES or NO

Hemorrhoids or Rectal Bleeding  YES or NO

Constipation or Diarrhea  YES or NO

Breast Lump  YES or NO

Are there any recent changes in:  
 appetite or eating habits  YES or NO  
 Your bowel habits?  YES or NO

Habits:  
 Exercise  YES or NO Type of Exercise: hiking How often?  
once a month

Do you smoke?  YES or NO How much?

Did you ever smoke?  YES or NO How many years?

Do you chew tobacco?  YES or NO

Do you wear seatbelts/helmets?  YES or NO

Do you do regular breast exams or testicular exams?  YES or NO

Do you drink alcohol?

Never  Rarely  Moderately  Daily

How many drinks do you have in an average week?

Have you ever been treated for drug habits?  YES or NO

Do you sleep well?  YES or NO

Is your diet well-balanced?

Salt Intake  Light  Moderate  Heavy

Fat Intake  Light  Moderate  Heavy

Caffeine  Light  Moderate  Heavy

Have you ever taken estrogen?  YES or NO

List all medications, vitamins, or hormones you are now taking, the amount and frequency:

Sex: Satisfactory?  YES or NO

Work:  hrs. per day  Indoors  outdoors

Do you like your work?  YES or NO

Recreation: Do you participate in sports or have any hobbies which give you relaxation at least 3 hrs. weekly?  YES or NO

TV	<u>1-2</u>	hrs/day
Reading	<u>2-3</u>	hrs/day
Vacations	<u>3</u>	wks/year

Have you ever completed a living will?

Have you designated a medical power of attorney?  YES or NO

Women ONLY

Menstrual History:

Age at onset 13

Regular  YES or NO

Cycle 25 days (from start to start)

Usual Duration 4 days

Heavy  Medium  Light

Pains or Cramps  YES or NO

Date of Last Period

Date of Last Pap Smear July 1992

Last Mammogram

Pregnancies

How many times have you been pregnant? 2

How many children born alive 2

How many miscarriages 0

Any complications with pregnancy  YES or NO



GEORGETOWN UNIVERSITY MEDICAL CENTER

Department of Medicine

February 29, 1996

Dear

Thank you for agreeing to see my patient Sharon White in consultation for consideration of the further management of metastatic breast cancer. I will review her history for you below.

Mrs. White is a 45-year-old woman who was in excellent health until the fall of 1992 when her internist discovered a lump in her right breast. This was ultimately found to be an infiltrating ductal carcinoma, and she underwent a lumpectomy with axillary dissection followed by six cycles of adjuvant chemotherapy with Cytoxan, Adriamycin, and 5FU. Her initial tumor was 2.5 cm with negative estrogen and progesterone receptors. 0/18 lymph nodes were involved at the time of diagnosis. Her initial staging evaluation included a chest x-ray and liver function tests, which were normal. Mrs. White did well until recently when she noted a vague discomfort in her right upper quadrant. I obtained an ultrasound of the right upper quadrant which revealed several hyperechoic lesions in the liver ranging in size from 1 to 4 cm consistent with metastases. I obtained a CT scan of the abdomen and pelvis which showed three discrete hypodense lesions in the liver corresponding to those on ultrasound. The largest lesion measures 3.5x3.5 cm. A CT-guided aspirate of the liver showed adenocarcinoma consistent with breast primary. A chest x-ray also shows multiple small bilateral pulmonary nodules consistent with metastatic disease. Aside from mild hepatomegally, her physical examination is normal. On laboratory evaluation, the bilirubin level is 0.9, SGOT 58, SGPT 46, alkaline phosphatase 315. A CA 15-3 level is 215. Because she also complained of some discomfort in the upper part of her thoracic spine, I obtained a bone scan which was normal. In addition, because I believe high-dose therapy autologous marrow support may be a consideration for Mrs. White, I performed a bone marrow aspiration and biopsy. These studies reveal normal cellularity without evidence of metastatic disease.

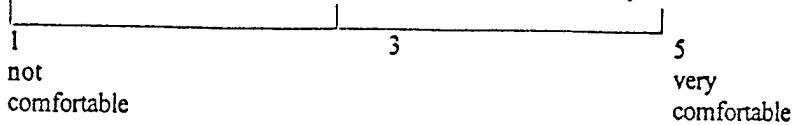
Aside from her breast cancer, Mrs. White has had an unremarkable past history. She does not take any medications. She is married with two children ages 15 and 13. She currently works in the home as a graphic designer.

I have explained to Sharon White that she now has metastatic breast cancer. I would appreciate your further input with regard to treatment approaches. I look forward to hearing your impressions.

Sincerely yours,

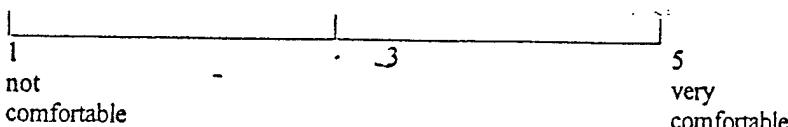
Benjamin Linas, M.D.

How did you feel in the physician's office when you arrived?

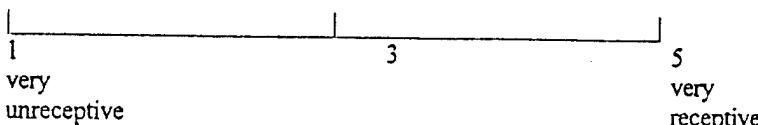


1. How many treatment options did the physician discuss with you? \_\_\_\_\_

2. How comfortable was the physician discussing treatment options with you?



3. How receptive was he/she to your questions?

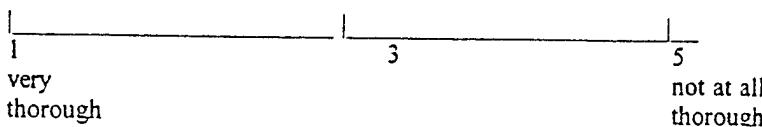


4. What treatment do you think the physician recommended/prefers you to receive (please describe)?  
\_\_\_\_\_

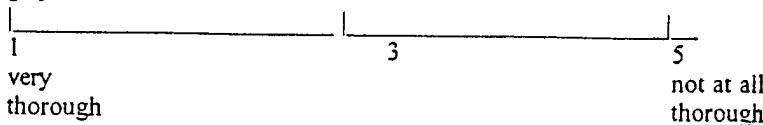
5. What did you feel was the physician's goal in recommending treatment?  
The treatment will

- a. maximize survival
- b. maximize quality of life
- c. other \_\_\_\_\_

6. How thoroughly did you feel the physician discussed Sharon White's medical case?



7. How thoroughly did you feel the physician discussed Sharon White's psychosocial case?



## Physician Questionnaire

Thank you for taking the time to provide the following demographic information.

Physician number. 37

Please provide the following personal information in the spaces provided below:

Date of birth \_\_\_\_/\_\_\_\_/\_\_\_\_

Please check the boxes which describe you best:

Race

- White
- Black
- Hispanic
- Asian
- Native American
- Other \_\_\_\_\_

Gender

- Male
- Female

Please provide the following information about your practice in the spaces provided below:

When did you graduate from medical school? (month, year) \_\_\_\_/\_\_\_\_

Please describe the setting where you practice:

(Check as many as apply)

- private office
- hospital
- university hospital
- single-specialty group practice
- multi-specialty group practice
- other (please specify) \_\_\_\_\_

About how many times would you see a typical patient, on average, before making a treatment recommendation or referring for treatment?

- once
- twice
- depends -- as few as \_\_\_\_\_ and as many as \_\_\_\_\_
- other (please specify) \_\_\_\_\_

How many patients are eligible for bone marrow transplant or would you refer for bone marrow transplant in your practice per year?

- 1 - 5
- 6 - 10
- 11 - 20
- 21 - 30
- greater than 30

A 49-year-old woman whom you treated two years ago with Adriamycin-based conventional dose chemotherapy for a stage III infiltrating ductal carcinoma of the left breast. At the time of diagnosis, this patient was ER positive. Six months ago while on vacation in Florida, this patient was evaluated at an Emergency Room for back pain. An X-ray was normal and she was put on non-steroidals which helped the pain for a few weeks. However, the pain persisted when the non-steroidals were discontinued, and the patient followed up with a general medical oncologist. A bone scan was performed that revealed foci consistent with metastatic disease in the right hip, the L-2 and L-3 vertebral bodies and the right humerus. Additional staging work-up at that time revealed 5 to 7 lesions in the right and left lobes of the liver, none exceeding 1.5 cm in diameter. The patient was started on Tamoxifen and because of her symptoms received four cycles of conventional dose CAF in Florida. Follow-up testing done three months after initiating therapy revealed some resolution of L-1, L-2 lesions and near complete resolution of the right humerus bone lesion. Two of the original seven liver lesions remain and no additional sites of metastatic disease were identified. The patient now presents in your office after her stay in Florida to discuss future treatment options. She is currently asymptomatic and only taking Tamoxifen. Restaging studies are performed which reveal no change in the bone lesions from two months ago, however, the remaining two liver lesions have doubled in size and a new foci of metastatic disease is identified in the caudate lobe of the liver.

As this patients physician, which form of adjuvant chemotherapy would you advise your patient to receive?

- a. I would recommend/refer for conventional dose chemotherapy for this patient.
- b. I would recommend/refer for conventional dose chemotherapy followed by high-dose chemotherapy and peripheral blood progenitor cell or autologous bone marrow support.
- c. I would recommend/refer for an intermediate dose of chemotherapy requiring growth factor support, but not requiring the infusion of peripheral blood progenitor cells or autologous bone marrow.

What is the primary consideration for this choice?

- Maximize survival
- Maximize quality of life
- Other (please specify)

How would you phrase your treatment recommendation to this patient (Please record your response as closely as possible to your actual conversational style)?

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INFORMATION FRAMING IN PHYSICIAN DESCRIPTION OF  
TREATMENT OPTIONS FOR CANCER PATIENTS

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Patients with metastatic breast cancer frequently undergo aggressive therapy that has an uncertain quality-adjusted survival advantage. Framing theory suggests that individuals may not maximize their expected utility if presented with treatment options described in the negative (focused on the tumor), as opposed to the same information described in the positive (focused on remaining quality of life). We developed a survey to address treatment recommendations by oncologists who offer stem-cell transplant therapy to patients. The survey collected demographic data and written descriptions of the treatment recommendations for three standardized patient scenarios. Analysis of the closed-ended questions included descriptive statistics and log-linear regression of the recommendation of aggressive treatment across the three scenarios on physician characteristics and practice patterns. The survey was sent to 155 oncologists affiliated with private stem-cell transplant network, with 60% responding. Twenty-two percent of physicians recommended aggressive treatment for all three scenarios, 33% in only two scenarios, and 45% in only one scenario. In univariate analysis, physicians who recommended stem-cell transplantation in all three cases were likely to do so to improve survival ( $p<0.001$ ) and were more likely to present the information in a negative frame. Physicians who did not recommend stem-cell transplantation in all cases were more likely to recommend an alternative treatment to improve quality of life ( $p<0.02$ ). This study provides evidence that physicians may frame the description of treatment options when informing patients about aggressive cancer therapies.

## ABSTRACT FORM

### Full Abstract

#### PSYCHOSOCIAL AND BEHAVIORAL

#### FACTORS IN WOMEN'S HEALTH:

Research, Prevention, Treatment, and Service  
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#### **TITLE:** MEASURING INFORMATION FRAMING IN A CLINICAL SETTING: A NOVEL APPROACH TO INSTRUMENT DEVELOPMENT

**AUTHOR/S AND AFFILIATION/S** Yabroff KR, Boekeloo B, Seils DM, Schulman KA. Georgetown University Medical Center and George Washington University, Washington, D.C.

Physician-patient communication is a crucial component of decision-making, yet cancer patients have made aggressive treatment decisions that physicians have indicated they would not choose. In carefully controlled scenarios, researchers have shown that patient sensitivity to the manner of information presentation, or information framing, can systematically influence treatment choices. However, when faced with evaluating information framing in a clinical setting, we did not find any communication instruments sensitive to the subtleties of information framing while considering physician, patient, and health care delivery system heterogeneity. We utilized a novel method to develop an information framing instrument. First, we audiotaped twenty physician-patient discussions of cancer treatment options to document the categories of conversation. We then surveyed a group of 150 oncologists affiliated with a community-based stem-cell transplantation network and requested free-form written treatment recommendations in response to three cancer patient scenarios. To evaluate the scenario responses, we utilized the categories from the audiotapes, subdivided statements within the categories into positive, negative, and neutral context and performed content analysis. Agreement between two coders blinded to the patient scenarios and treatment recommendations was over 85% for 112 of 123 combinations of scenario, category, and statement context. Finally, the information framing instrument will be refined for use in a clinical setting by testing the instrument on audiotapes of simulated breast cancer patients' consultations with oncologists. By controlling for patient characteristics in the early stages of instrument development and incrementally approximating a clinical environment, our instrument will be sensitive to subtle aspects of conversation as well as physician, patient, and health care delivery characteristics. The instrument can then be used to evaluate the influence of physician communication about risky treatment on patient decision-making about breast cancer in a clinical setting. This methodology can ultimately be applied to other diseases where treatment options carry considerable risk and uncertain reward.

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INFORMATION FRAMING IN PHYSICIAN DESCRIPTION  
OF BREAST CANCER TREATMENT OPTIONS

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**PURPOSE:** The purpose of this study was to assess the presence of information framing in physicians' written descriptions of treatment options for breast cancer scenarios.

**METHODS:** 155 community oncologists affiliated with a stem-cell transplant network were surveyed with 63% of the oncologists responding. We used three written patient scenarios to elicit oncologists' treatment recommendations, goals of treatment, and written discussion of treatment options. Content analysis was used to summarize the free-form physician responses. The phrasing of treatment recommendations was evaluated among the three scenarios and compared to physician characteristics, patient characteristics, and treatment recommendations.

**RESULTS:** Physicians were more likely to recommend investigational treatment to improve survival ( $p<0.01$ ) and to recommend an alternative treatment (e.g., conventional dose chemotherapy) to improve quality of life ( $p<0.01$ ). Physicians recommending investigational treatment across the three cases were less likely to use a positive frame in their description ( $p<0.01$ ). Additionally, the content or subject matter of the description of treatment options was found to be systematically different across the three patient scenarios which were varied by expected prognosis ( $p<0.05$ ). Patients' expected prognosis, physician practice characteristics, the goals of treatment and treatment recommendations were related to the phrasing of treatment options. Physician characteristics were unrelated to the treatment recommendations and the phrasing of treatment options ( $p>0.10$ ).

**CONCLUSIONS:** Our findings were consistent with physician use of information framing when describing treatment options to cancer patients. The methodology utilized to evaluate free-form written discussions of treatment options in the survey can be applied to evaluate communication and information framing in a clinical setting.

**KEY WORDS:** Physician-patient communication, information framing, content analysis, oncology, decision-making, stem-cell transplantation, breast cancer

Good communication is the foundation of a shared clinical decision-making process and is crucial for the maximization of patient benefit from treatment for cancer. Yet, patients with cancer often elect to receive more aggressive or investigational treatments, the potential benefits of which are uncertain, while physicians have reported that they would not make similar treatment decisions for themselves (1-5). Patients and physicians have also reported differences in their interpretations of the content of their interactions (6-8), in their estimates of patient participation in the decision-making process (9), and in their expectations of treatment benefits (6-8). In a survey of cancer patient expectations, 33% of patients being treated palliatively indicated that they thought their treatment was potentially curative, although their physicians reported that they had told patients the goals of treatment in ninety percent of these cases (7). Patient overestimation of treatment benefit has also been documented by independent observers of patient-physician consultations (8).

In communication about disease risk and probability of therapeutic outcomes, the manner in which the information is presented can affect both physician interpretation of disease frequency (10-13) and patients' preferences for treatment outcomes (13-17). More specifically, when presented with a choice between a certain outcome (one possible outcome with known occurrence) and an uncertain outcome (several possible outcomes, each characterized by the probability of their occurrence), the manner in which the outcome is framed has been shown to influence that choice (18-24). The initial studies of information framing by Kahneman and Tversky presented subjects with the following scenario:

Imagine that the U.S. is preparing for the outbreak of an unusual Asian disease, which is expected to kill 600 people. Two alternative programs to combat the disease have been proposed. Assume that the exact scientific estimates of the consequences of the programs are as follows:

**Problem 1**

If program A is adopted, 200 people will be saved.

If program B is adopted, there is a one-third probability that 600 people will be saved and a two-thirds probability that no people will be saved.

### **Problem 2**

If program C is adopted, 400 people will die.

If program D is adopted, there is a one-third probability that nobody will die and a two-thirds probability that 600 people will die.

The expected outcomes are equivalent among the four options, but in problem one, where the outcomes were described in a positive frame (as lives saved), 72% of subjects chose the sure option, program A, and 28% of subjects chose the gamble, program B (18,19). In problem two, where the outcomes were described by a negative frame (as death resulting from disease), 22% of subjects chose the sure option, program C, and 78% of subjects chose the gamble, program D (18,19). When presented choices that are identical except in their expression of treatment outcome, individuals were found to be risk averse for gains expressed as lives saved and risk-seeking when avoiding losses, deaths from disease.

Framing effects have been documented with the use of treatment scenarios describing treatment for lung cancer (21), breast cancer (22), angina (20), headache (20), and an unspecified chronic disease (20). Other scenarios have elicited responses based on the frame of the treatment options, but in the opposite direction --more subjects have chosen the “riskier” option when presented with a positive frame (23-25,28). However, in actual clinical practice framing effects have been difficult to assess (26, 29). Observational studies cannot manipulate patient characteristics, physician characteristics, and the health care delivery systems that have been shown to be related to treatment decisions (30-33). Further, in observational studies of clinical settings, the actual conversation between physicians and patients is not constrained in content or duration, which makes conversation difficult to analyze in a systematic fashion. The large sample sizes required to evaluate each of these potential patient and physician covariates necessitate the development of more innovative methods for the evaluation of information framing in clinical practice.

In the following sections, we describe such a measure and its use in the reciprocal model of information framing in medicine, one focusing on physician presentation of

treatment options rather than subject or patient behavior in response to the presentation of treatment options.

## METHODS

In this section, we describe our study of information framing where we evaluated the information that physicians provided to breast cancer patients. We report on a written survey of community-based oncologists whose practice includes high-dose chemotherapy and autologous stem-cell transplantation. Breast cancer scenarios were used to capture treatment recommendations and the phrasing of the description of treatment options. We then describe the development and validation of an information framing instrument for use with free-form text descriptions of treatment options. Finally, we report on the analysis of the survey focusing on two hypotheses related to framing effects: 1) the content of the physician's description of treatment options will differ between patient scenarios which vary by the expected patient prognosis; and 2) there is a relationship between the use of negative phrasing and more aggressive treatment recommendations and the use of positive phrasing and less aggressive treatment recommendations.

### Study population and data

We developed a survey to record the information that physicians convey to patients with breast cancer. We implemented this survey in a population of physicians likely to discuss high-risk treatments with their cancer patients -- oncologists affiliated with a stem-cell transplant network and identified as having performed at least one stem-cell transplant in the previous year. To elicit the information conveyed to breast cancer patients, the survey presented three breast cancer scenarios varied by expected prognosis (based on stage, previous treatment, age, and comorbidities). The survey also requested that physicians provide a written discussion of treatment options for each case in a style similar to their usual conversation with patients (see Appendix for the complete description of each

case). For each scenario, the physicians were asked to recommend one of three treatment options: conventional dose chemotherapy; conventional dose chemotherapy followed by high-dose chemotherapy and peripheral blood progenitor cell or autologous bone marrow support; or an intermediate dose of chemotherapy requiring growth factor support but not requiring the infusion of peripheral blood progenitor cells or autologous bone marrow. The physicians were also asked to provide a primary reason for their treatment recommendations. Two other sections of the survey recorded demographics and information related to each physician and his or her practice style, such as the number of times the physician would speak with the average patient prior to recommending a treatment.

The survey was distributed to 155 oncologists affiliated with a stem-cell transplant network. Of those, seven were no longer available at the same address. After one month, non-responders were sent another survey. The survey was completed by 93 oncologists for a final response rate of 63%.

#### Development of Content Instrument

We developed an instrument to assess the use of framing by physicians in their conversations with cancer patients using partial transcriptions of audiotapes of twenty initial consultations between oncologists and cancer patients. Content analysis, a process that divides a conversation into its smallest meaningful pieces (34), was used to evaluate the information contained in the free-form descriptions of treatment options from the audiotapes. Subject or content categories were defined by classifying the types of information (e.g. quality of life, previous therapy, remission) contained in the physician-patient consultation. These content categories were defined further by coding a sample of 40 cases from the written physician survey.

Based on the review of tape-recorded physician-patient interactions and preliminary coding, seventeen content categories were developed. These content categories included

the mention of the type of previous therapy; future therapy; future benefits; reference to tumor growth or metastases; specific reference to cancer, nodes, or disease; response to therapy; side effects of treatment; survival or long-term cure; quality of life; other aspects of life (e.g. family, friends); shorter term outcome (e.g., remission); physician experience with similar patients or clinical trial evidence; physician preference for treatment; specific mention of risk or chance; general uncertainty; general effects of treatment; and other symptoms of disease.

For ease of coding, the coding worksheets were divided into four sections for each of these seventeen content categories -- a general discussion section unrelated to treatment recommendation and three sections devoted to each of the three potential treatment options. Each content category in each section was subdivided into context of statements -- positive (in support of the treatment option), negative (against the treatment option) or neutral (mentioned, but neither positive nor negative).

The written description of treatment options was assessed by two coders blinded to the case, the physician's treatment recommendation, the reason for treatment recommendation, and the physician subject number. After each coder completed all available cases, the four sections of the coding worksheet were collapsed into summary counts of positive, negative, or neutral statements by content category for each case. The category "other symptoms of disease" was eliminated since neither coder used this category in her assessment. Due to low frequencies and similarity of content, the categories "future benefits" and "future treatment" and the categories "other aspects of life" and "quality of life" were combined.

From the 93 survey respondents, 219 free-form scenario recommendations were analyzable by both coders<sup>1</sup>. Dummy variables were created to represent the presence of each combination of content and context categories (positive, negative, or neutral) for each of the three case scenarios. Correspondence between the two coders was evaluated across

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<sup>1</sup> Not all physicians completed all three scenarios.

the seventeen content categories and the three context categories for each of the 219 scenarios. Agreement between the two coders was over 85% for 112 of the 123 combinations of case, content, and context. For the other eleven categories, agreement between the two coders was over 70%. Because of the lack of variability in this binary data, kappa statistics are not reported.

### Analysis of Survey

Descriptive demographic statistics were calculated for respondents and non-respondents where this information was available. Descriptive statistics and chi-square tests of homogeneity were performed for treatment recommendation and reason for treatment across the three patient scenario cases. Univariate and multivariate log-linear regression models were estimated to evaluate the relationship between physician and practice characteristics, the goals of treatment and the physician recommendation of aggressive treatment (conventional dose chemotherapy followed by high-dose chemotherapy and peripheral blood progenitor cell or autologous bone marrow support) across the three cases.

The model of information framing in previous studies used symmetrically opposed outcomes (e.g. life vs. death) to examine subject responses to positive and negative frames (18-24). Since our survey utilized free-form descriptions of treatment options to evaluate written recommendations to patients, the potential number of content areas was very large. We approached the evaluation of information framing in this study by assessing physician phrasing in two sets of analyses. First we assessed the impact of the expected patient scenario prognosis on content and context phrasing, and then we evaluated physician characteristics, practice characteristics, and treatment recommendations relative to their phrasing of treatment options.

To evaluate the phrasing of treatment recommendations among patient cases, we calculated the frequency of each content and context area across the respondents for each of the three patient cases. We also calculated the frequency of each content and context area for each case where aggressive treatment was recommended. Differences in the frequencies of the discussion of these content areas (i.e., survival, quality of life) and context of the content areas (i.e. positive discussion of survival, negative discussion of survival) among the three cases were assessed as supportive of information framing in physician discussion of treatment options. The results of the chi-square tests of homogeneity are reported only where the number of observations per cell indicate that the test is valid.

We also evaluated the phrasing of treatment recommendations across cases using a model of information framing based on clinical practice. We took the discussion of disease as a negative frame, one focusing the patient on sunk costs, the unalterable fact of their disease. We took the discussion of other aspects of life, such as family or quality of life, as a positive frame, one focusing patients on their future. We summarized this phrasing information across the three cases and assigned binary variables corresponding to the mention of disease and the mention of other aspects of life as dependent variables. Physician characteristics, practice characteristics, treatment recommendations, and the reason for treatment recommendation were used as the independent variables in univariate and multivariate logistic regression analyses.

Comparisons where  $p < 0.05$  are reported as statistically significant, and comparisons where  $p < 0.10$  are discussed as trends.

## RESULTS

Ninety-one percent of the physicians responding to the survey described themselves as White, 6.5% as Hispanic, 1% as Asian, and 1% as Other. On average, the physicians were 46 years old. About 94% were male. During the year of the survey, these physicians treated an average of three transplant patients. These demographics and practice characteristics were similar between physicians responding to the survey and non-respondents (see Table 1)

The respondents were evenly divided between general oncology and a mixed practice of general oncology and stem-cell transplant. On average, physicians reported that they saw a typical patient 2.3 times prior to recommending treatment for their cancer.

In response to the first scenario case, which described a previously healthy 39-year-old woman with newly diagnosed, high risk stage II breast cancer, 97% of physicians recommended stem-cell transplantation, and the remainder recommended standard dose chemotherapy (see Appendix for the complete description of each case). In the second case scenario, which described a 47-year-old woman with metastatic disease following adjuvant chemotherapy for stage II disease, 55% recommended stem-cell transplantation, 13% recommended intermediate dose chemotherapy, and 33% recommended standard dose chemotherapy. In case three, which described a 49-year-old woman with stable metastatic disease, 32% of physicians recommended stem-cell transplantation, 10% intermediate dose chemotherapy, and 58% recommended standard dose chemotherapy (see Table 2). These written case scenarios elicited different treatment recommendations from physicians in our sample ( $p<0.001$ ).

When providing a reason for their treatment recommendations in case one, 95% of physicians recommended treatment to maximize survival, and 5% recommended treatment to maximize quality of life (see Table 2). In case three, these percentages almost reversed - 73% recommended treatment to maximize quality of life, and 27% recommended

treatment to maximize survival. In case two, 56% of physicians recommended treatment to improve survival, and 44% of physicians recommended treatment to improve quality of life. The goals of treatment were also different between the three patient scenarios ( $p<0.01$ ).

In univariate log-linear analyses, physicians whose stated goal of treatment was to improve survival in all three cases were more likely to recommend the more aggressive stem-cell transplantation in all the three cases ( $p<0.01$ ). Physicians whose stated goals of treatment were to improve quality of life for two cases were less likely to recommend stem-cell transplantation across the three cases ( $p<0.01$ ). All other covariates -- physician age, physician gender, physician race, the number of new bone marrow/stem-cell transplant patients a year, the number of times a physician would see a patient prior to making a recommendation, and the type of practice -- were unrelated to the recommendation of aggressive treatment across the three cases ( $p>0.10$ ) (see Table 3). When controlling for physician characteristics and practice characteristics in multivariate analyses, physicians' goals to improve quality of life remained negatively associated with the recommendations of aggressive treatment ( $p<0.07$ ). No other covariates were related to the recommendation of aggressive treatment across the three cases ( $p>0.10$ ). The addition of interactions between the covariates did not affect the estimates.

#### Evaluation of the phrasing of treatment recommendations

The content categories and the context of the statements used by the physicians in the free-form descriptions of treatment options for each of the patient cases are summarized in Table 4. There were significant differences among cases in the frequency at which previous therapy, cancer growth/metastases, response to therapy, survival, quality of life, remission/recurrence, physician experience with similar patients or clinical trials, and risk/chance were discussed ( $p<0.05$ ). We also found differences in the discussion of

disease ( $p<0.10$ ). When information was summarized by content area, more physicians discussed risk or chance, their experience with similar patients or clinical trial results in case one more than in the other two cases ( $p<0.05$ ). More physicians discussed previous therapy, response to therapy, and quality of life in case three than in the other two cases ( $p<0.05$ ). In case two, more physicians referred specifically to the cancer or affected nodes and cancer growth or metastases, and they phrased their discussion using uncertainty modifiers such as "might" or "could" ( $p<0.05$ ).

There were also differences among the cases in the context of the statements used (see Table 4). In case one, where 97% of oncologists recommended aggressive treatment, recurrence was mentioned more than twice as frequently as remission. Recurrence was mentioned less frequently than remission in case two (55% recommended aggressive treatment) and case one (32% recommended aggressive treatment). In case two, negative aspects of cancer growth and survival were mentioned much more frequently than their positive aspects. In case three, survival was mentioned negatively more frequently than positively. The content of physician descriptions of treatment options and the context used in presenting these content areas differed systematically among the three case scenarios.

We then evaluated only the cases where aggressive treatment was recommended and still found differences in content areas discussed among patient cases (see Table 5). There were significant differences in the frequency that previous therapy, cancer growth/metastases, response to therapy, survival/long term cure, quality of life, physician experience, and risk/chance were discussed among the cases ( $p<0.05$ ). There was also a difference in the frequency of explicit reference to disease ( $p<0.10$ ). Because of smaller frequencies, we were unable to assess differences in context among the three scenarios when holding treatment recommendation constant. Physician phrasing was related to patient characteristics even when controlling for treatment recommendation.

Evaluation of Physician Characteristics, Practice Characteristics, Treatment Goals, and Treatment Recommendations with the Phrasing of Information

We evaluated the physician description of treatment options in the clinical model of information framing using specific references to other aspects of patient life (positive frame) and disease (negative frame). In univariate analyses of the positive frame, we found that physicians recommending aggressive treatment across the three cases were less likely to discuss other aspects of life ( $p<0.01$ ) as compared to physicians recommending aggressive treatment for a single case. Physicians recommending aggressive treatment across two cases were more likely to discuss other aspects of life as compared to physicians recommending aggressive treatment for a single case ( $p<0.10$ ). The treatment goal of improving survival across the three cases was associated with a decreased likelihood of mentioning other aspects of life ( $p<0.01$ ). Physicians recommending treatment to improve quality of life twice were more likely to discuss other aspects of life ( $p<0.10$ ). Patient characteristics and practice characteristics were unrelated to the mention of other aspects of life ( $p>0.20$ ). When controlling for patient characteristics and practice characteristics in multivariate analysis, only the recommendation of aggressive treatment across the three cases was related to a decreased likelihood of mentioning other aspects of life ( $p<0.02$ ), the positive frame. The addition of interactions between the covariates did not affect the estimates.

In univariate analyses of the negative frame, the increase in the number of words used in the descriptions was related to an increased likelihood of a specific reference to disease ( $p<0.07$ ). Male physicians were less likely to refer specifically to disease than female physicians ( $p<0.08$ ). Physicians recommending aggressive treatment across two of the cases were more likely to refer specifically to disease as compared to physicians recommending aggressive treatment in only a single case ( $p<0.06$ ). All other physician characteristics, practice characteristics, and goals of treatment were unassociated with the recommendation of aggressive treatment across the three cases ( $p>0.10$ ). When controlling

for the influence of physician characteristics and practice characteristics, the number of words used in the description of treatment options was related to the mention of disease ( $p<0.03$ ). Additionally, physicians describing themselves as practicing in a mixed, general oncology and transplant group were more likely to mention disease when discussing treatment recommendations ( $p<0.10$ ) as were physicians performing more than three transplantations in the previous year ( $p<0.05$ ). All other covariates were unrelated to discussion of treatment options using a negative frame. The addition of interactions between the covariates did not affect the estimates.

In the evaluation of the positive frame, individual physician characteristics and practice characteristics were unrelated to the reference to quality of life during the description of treatment options ( $p>0.10$ ). However, in the evaluation of the negative frame, both physician practice type and the number of transplant patients treated in the previous year were related to an increased reference to disease ( $p<0.08$ ). Although we found support for increased use of a negative and positive frame where physicians recommended aggressive treatment across two scenarios in univariate analysis, these effects were not found after controlling for other factors. However, we did find that when physicians recommended aggressive treatment across the three patient cases they were less likely to use a positive frame when describing treatment options.

## DISCUSSION

The decision to undergo a specific treatment for disease is related to patient characteristics, physician characteristics, health delivery system characteristics, and the communication between the physician and the patient. With the large variability associated with each of these factors, we utilized patient scenarios to isolate the role of physician communication to patients and to evaluate information framing as part of the decision-making process.

We were able to demonstrate that physician treatment recommendations and the goals of treatment differ systematically among patient cases varied by expected prognosis. Physicians indicated that their goals for aggressive treatments are to improve patient survival and that their goals for less aggressive treatment are to improve patient quality of life. Physician characteristics and practice characteristics were unrelated to the recommendation of aggressive treatment across the three cases.

The results of our analyses offer strong support for our hypotheses related to the presence of information framing in the physician description of treatment options. We found systematic differences in the phrasing of treatment options among the patient scenarios. Treatment recommendations and the goals of treatment influenced how written treatment information was presented in response to breast cancer patient scenarios. Physicians recommending aggressive treatment across the three cases were less likely to present information framed positively. We also found that the number of words was related to this use of the negative frame, but not the positive frame. This is consistent with a previous study in a clinical setting where only negative framing was associated with a greater number of discussion topics during consultation (29).

An observational study of a clinical setting found that physician communication style was unaffected by severity of illness of the breast cancer patient (29). In contrast, we found that the content of the presentation of treatment options by physicians differed systematically among patient scenarios. The context used in these statements (positive, negative, and neutral) was also found to differ among the patient scenarios. In fact, the phrasing used by physicians in their description of treatment options was related to patient characteristics even where the recommendation of aggressive treatment was constant across the three cases. Our analysis of three patient scenarios evaluated by all eighty physicians, rather than one-hundred different patients seen by sixteen different physicians (29), may have helped to eliminate some variability associated with patient and physician characteristics and increase our power for detection of differences in communication.

Additionally, we used content analysis, a qualitative method increasingly used to make inferences about the communication of health risks (35-37), to evaluate the phrases and their context in the description of treatment options. Content analysis allowed us to summarize and quantitatively assess both content and context in the transfer of information from physician to potential patients in clinical applications of the information framing model.

Previous studies have found that physician preferences for cancer treatment differ based on physician specialty (30-33) and practice type (30-33). The detail of diagnosis and treatment information conveyed to patients has been shown to be related to physician gender, age, and specialty (6). We did not find any strong relationships between physician characteristics or practice characteristics and the treatment recommendations. We also did not find relationships between physician characteristics or practice characteristics and the use of a positive frames in the phrasing of the description of treatment options. However, practice type and the number of transplant patients treated by the physician were related to increased use of the negative frame. The lack of variability in our sample for physician characteristics and treatment recommendation in the first scenario may have prevented us from finding stronger relationships in our log-linear and logistic regression models. In our analyses, patient characteristics, practice characteristics, the goals of treatment, and treatment recommendations explained most of the detectable variability in physician phrasing of treatment options.

Framing effects have been measured using subject responses to hypothetical scenarios where subjects choose from two alternative treatments with equivalent expected outcomes (18-22). These effects, however, may be more difficult to quantify when evaluated with actual cancer patients in an uncontrolled clinical setting (23,26,29). Several of these studies have described and explored a “mixed frame,” a category that includes both positively and negatively framed treatment information (27,29). We found that some physicians described content areas both positively and negatively (i.e., remission and

recurrence) for the same scenario. We also found that physicians who recommended aggressive treatment for two cases (as compared to those who recommended aggressive treatment for a single case or for all three cases) were more likely to use both a positive frame and a negative frame in univariate analyses. Although these effects disappeared when controlling for other factors in multivariate analysis, the results of our study offer support for the presence of a mixed frame in physician conversation and provide further evidence of the complexity of physician-patient interaction.

We approached the measurement of information framing from the perspective of the physician as the provider of treatment information using physician responses to patient scenarios to describe the content and context of the discussion of treatment options. By simultaneously controlling patient variability and allowing for unconstrained descriptions of treatment options, we were able to describe information framing in physician discussions with cancer patients. The content instrument we developed may be used and refined for clinical settings to summarize and evaluate physician-patient communication patterns in the hopes of improving patient decision-making and the management of patients with breast cancer.

#### LIMITATIONS

Our sample of physicians is not representative of all physicians that treat or discuss treatment options with breast cancer patients. Additionally, the therapeutic choices offered in the patient scenarios were investigational and not considered by all physicians to be standard of care for the breast cancer patients described in the scenarios. However, the physicians we surveyed were an excellent population for this study since they offer these therapies to patients as part of their practices.

Our method of evaluating physician description of treatment options to patients used written scenarios only, so we could not evaluate nonverbal physician behaviors or any patient contributions to the physician-patient interaction. Additionally, physicians were

requested to write, rather than verbalize their descriptions. This may not fully reflect the content of an actual conversation.

All three scenarios were presented to all physicians in the same order, so we cannot evaluate the impact of scenario order on physician recommendation of treatment or the phrasing of that recommendation. Although the scenarios were ordered according to decreasing prognosis, more physicians discussed quality of life and future benefits of treatment in case three than in the other cases, and fewer physicians discussed their experience with similar patients or the results of clinical trials in case three than in the other cases. This variability in the range of physician responses across the three cases indicates that the impact of any order effect would be minimal.

## CONCLUSIONS

Understanding physician treatment recommendations, goals for treatment, and the manner of treatment information presentation will lead to a greater understanding of physician-patient communication and shared decision-making. We have shown that physicians may use information framing to communicate their treatment goals to cancer patients. Using a controlled setting to evaluate physician communication, as in this study, could lead to a significant advance in our understanding of the influence of information presentation in patient decision-making and help breast cancer patients, their families, and their physicians optimize their treatment decisions.

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## Appendix

The following are the three scenarios of breast cancer patients presented to the physicians in the survey. For each of the cases, physicians were requested to provide a treatment recommendation, and a free-form description of the treatment options to the patients.

### CASE 1

A previously healthy 39-year-old married premenopausal woman discovers a lump on a routine breast exam. She sees her gynecologist who recommends a mammogram and performs a physical exam. The physical exam is normal except for a 3x1 cm mass without accompanying skin changes in the right upper quadrant of her right breast. Bilateral mammograms are performed, with the left mammogram being normal and the right mammogram confirming a mass of 3.5x1.5 cm with microcalcifications suggestive of malignancy. The patient is referred to a surgeon who subsequently performs an incisional biopsy removing the entire mass and performing a subsequent lymph node dissection. The pathology report reveals a 3.5x1.5 cm infiltrating ductal carcinoma. There are areas of fat necrosis with perilymphatic invasion. Additional testing reveals that this tumor is aneuploid with a high DNA labeling index and does not express HER2-NEU. The tumor was ER negative and PR negative. Nineteen of 27 lymph nodes are involved with tumor. The surgeon orders additional tests before referring this patient to a medical oncologist. The tests include a urinalysis, CBC, liver function tests, alkaline phosphatase, and CA 15.3. All are normal. Bone scan, chest X-ray, abdominal CT are performed and reveal no evidence of metastatic disease. The patient has decided that she will undergo mastectomy of her right breast and now is referred to a medical oncologist to discuss the role of adjuvant chemotherapeutic options.

### CASE 2

A 47-year-old woman that you previously treated for stage II breast cancer three years ago with mastectomy, radiation, and six courses of CAF returns to your office complaining of upper right quadrant pain. Ultrasound of the right upper quadrant reveals two lesions approximately 2x1 cm each in the right and left lobes of the liver, respectively. Blood work performed at this time reveals a normal CBC, electrolytes, creatinine, and urinalysis. The SGOT and SGPT are normal. The total bilirubin is slightly elevated at 2.1 and the alkaline phosphatase is 427. A CEA is normal, however, the CA 15.3 is approximately 6 times normal. You explain to the patient that you believe she has recurrent breast cancer and that additional staging tests will need to be performed. A CT scan of the head and a bone scan are performed and are normal. CT scan of the chest, abdomen and pelvis confirms the two liver lesions seen by ultrasound and identified three small pulmonary nodules in the upper lobe of the right lung. Each nodule is approximately 1 cm in diameter and is clearly new when compared to a CT scan performed three years earlier. Bone marrow aspiration and biopsy reveal no evidence of malignancy by routine histological evaluation. The patient's estrogen and progesterone status were known to be negative on the original tumor. The patient is currently taking no medications and is otherwise in good health.

### CASE 3

A 49-year-old woman whom you treated two years ago with Adriamycin-based conventional dose chemotherapy for a stage III infiltrating ductal carcinoma of the left breast. At the time of diagnosis, this patient was ER positive. Six months ago while on vacation in Florida, this patient was evaluated at an Emergency Room for back pain. An X-ray was normal and she was put on non-steriodals which helped the pain for a few weeks. However, the pain persisted when the non-steriodals were discontinued, and the patient followed up with a general medical oncologist. A bone scan was performed that revealed foci consistent with metastatic disease in the right hip, the L-2 and L-3 vertebral bodies and the right humerus. Additional staging work-up at that time revealed 5 to 7 lesions in the right and left lobes of the liver, none exceeding 1.5 cm in diameter. The patient was started on Tamoxifen and because of her symptoms received four cycles of conventional dose CAF in Florida. Follow-up testing done three months after initiating therapy revealed some resolution of L-1, L-2 lesions and near complete resolution of the right humerus bone lesion. Two of the original seven liver lesions remain and no additional sites of metastatic disease were identified. The patient now presents in your office after her stay in Florida to discuss future treatment options. She is currently asymptomatic and only taking Tamoxifen. Restaging studies are performed which reveal no change in the bone lesions from two months ago; however, the remaining two liver lesions have doubled in size and a new foci of metastatic disease is identified in the caudate lobe of the liver.

**Table 1. Demographic Characteristics and Practice Characteristics of Survey Respondents and Non-Respondents**

	Respondents (n=93)	Non- Respondents (n=55)
Average Age	45.5 (5.99)	45.2 (5.41)
Race		
White	91.3% 6.5	86.0% 8.0
Hispanic	1.1	2.0
Asian	1.1	2.0
Other		
Gender		
Male	93.5% 6.5	86.0% 12.0
Female		
Years since graduation from medical school		*
6-10	8.6%	
11-15	19.8	
16-20	37.0	
21-25	18.5	
>25	16.0	
Average number of stem-cell (bone marrow) transplant patients treated during past year	3.4 (3.02)	2.5 (3.02)
Practice type		
general oncology	49.5%	*
mixed (general oncology and stem-cell transplant)	50.5	
Average number of times see typical patient prior to recommending treatment	2.34 (1.2)	*

**Table 2. Case Scenario Recommendations**

	Case 1	Case 2	Case 3	X <sup>2</sup>	p-value
Treatment Recommendation					
Stem-Cell Transplant	97.4% 0.0 2.6	54.9% 12.7 32.4	31.9% 10.1 57.9	73.23	0.001†
Intermediate Dose Chemotherapy					
Standard Dose Chemotherapy					
Primary Reason for Treatment					
Recommendation					
Survival	95.0% 5.0	56.0% 44.0	26.5% 72.5	72.5	0.000†
Quality of Life					

† Significant at p<0.05

**Table 3. Univariate Log-Linear Analysis of the Number of Recommendations of Stem Cell Transplantation (Aggressive Treatment) Across Three Patient Scenarios**

Parameter		Estimate	p-value
Physician Age			
Greater than 45		-0.0896	0.6049
45 or less		---	---
Physician Gender			
Male		-0.0345	0.9058
Female		---	---
Physician Race			
White		0.0834	0.7997
Non-White		---	---
Number of Times Physician would Speak with Patient before Making a Treatment Recommendation			
Two or More Times		-0.1018	0.5840
Less than Twice		---	---
Number of New Stem Cell/Bone Marrow Transplant Patients a Year			
More than Five New Patients		0.0127	0.9433
Less than Five New Patients		---	---
Practice Type			
General Oncology		0.1367	0.4288
Mixed (General Oncology and Transplant)		---	---
Primary Reason for Treatment Recommendation across the Three Cases:			
Three Recommendations to Improve Survival		0.5100	0.0061†
Two Recommendations to Improve Survival (One Recommendation to Improve Quality of Life)		---	---
One Recommendation to Improve Survival (Two Recommendations to Improve Quality of Life)		-0.5148	0.0063†

†Significant at p<0.05

**Table 4. Physician Discussion of Treatment Options by Content and Context of Phrasing**

Content Category*	Case 1	Case 2	Case 3	$\chi^2$	p-value
Previous therapy					
positive	2.5%	6.9%	11.3%	4.63	0.099
negative	1.3	11.0	25.4	20.74	0.001†
neutral	0.0	6.9	5.6	*	*
Future benefits or future therapy					
positive	2.5%	2.7%	5.6%	*	*
neutral	1.3	0.0	2.8	*	*
Cancer growth/metastases					
positive	1.3%	11.0%	18.3%	12.52	0.002†
negative	11.3	32.9	22.5	10.47	0.005†
Cancer/Node/Disease					
negative	40.0%	53.4%	35.2%	5.29	0.071
neutral	1.3	0.0	1.4	*	*
Response to Therapy					
positive	2.5%	15.1%	19.7%	11.45	0.003†
negative	1.3	1.4	4.1	*	*
neutral	1.3	2.7	1.4	*	*
Side effects of treatment					
positive	10.0%	6.9%	12.7%	1.38	0.501
negative	10.0	8.2	4.3	1.85	0.397
neutral	2.5	2.7	1.4	*	*
Survival or long-term cure					
positive	65.0%	38.4%	18.3%	34.22	0.001†
negative	28.8	63.0	40.9	18.57	0.001†
neutral	3.8	2.7	1.4	*	*
Quality of life					
positive	3.8%	16.4%	22.5%	11.75	0.003†
negative	0.0	2.7	0.0	*	*
neutral	1.3	2.7	4.3	*	*
Shorter term outcome					
positive (Remission)	17.5%	30.1%	15.5%	5.57	0.062
negative (Recurrence)	45.0	16.4	11.3	27.06	0.001†
Physician experience or results of clinical trials					
positive	32.5%	8.2%	0.0%	35.70	0.001†
negative	7.5	5.5	2.8	*	*
neutral	23.8	11.0	5.6	11.11	0.004†
Physician preference for treatment					
positive	21.3%	16.4%	28.2%	2.93	0.231
negative	2.5	6.9	8.5	*	*
neutral	2.5	1.4	0.0	*	*
Risk or Chance					
positive	41.3%	21.9%	14.1%	15.40	0.001†
negative	55.0	23.3	25.4	21.29	0.001†
neutral	0.0	1.4	1.4	*	*
General uncertainty					
positive	38.8%	37.0%	22.5%	5.24	0.073
negative	13.8	23.3	11.3	4.35	0.110
neutral	7.5	8.2	8.5	0.05	0.975
General effect of treatment					
positive	31.3%	15.1%	16.9%	7.20	0.027†
negative	11.3	15.1	15.5	0.71	0.703
neutral	2.3	0.0	0.0	*	*

NOTE: Chi-square performed only where valid based on the number of observations per cell. \*Context areas omitted from table where there were no observations among the three cases.